



November 7, 2016

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304



RE: Application for Rule 13 Construction Permit
Ascent Resources - Marcellus, LLC
WJ Criswell 405
Facility ID: 103-00098

Dear Sir/Madam,

Ascent Resources – Marcellus, LLC (Ascent) owns and operates the WJ Criswell 405 facility (Facility), which is located in Wetzel County, West Virginia. The Facility is currently permitted under G70-A124B, issued August 18, 2015.

Ascent is removing one (1) natural gas-fired compressor engine, updating the production and tank information, and requesting a conversion to a Rule 13 permit. To authorize the operation of equipment at the Facility, Ascent is submitting this application for a Rule 13 Construction Permit. The Facility consists of one (1) natural gas-fired generator, three (3) gas production units, one (1) line heater, one (1) flash separator heater, one (1) condensate stabilizer heater, three (3) condensate storage tanks, three (3) produced water storage tanks, one (1) enclosed combustor, and various support operations.

This Application has been prepared in accordance with the requirements set forth in 45CSR6, 45CSR13, and applicable guidance documents. Ascent will operate the Facility in compliance with applicable federal and state air quality regulations. The required attachments are included in addition to the application forms.

Enclosed is the original and two (2) copies of the application, along with the fee in the amount of \$2,000. If you have any questions or need additional information, please feel free to contact me at 405-252-7753.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Evan Foster Pearson'.

Evan Foster Pearson
EH&S Air Compliance Specialist

Enclosures

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WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475

www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT

AND

TITLE V PERMIT REVISION

(OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO NSR (45CSR13) (IF KNOWN):

- ☒ CONSTRUCTION ☐ MODIFICATION ☐ RELOCATION
☐ CLASS I ADMINISTRATIVE UPDATE ☐ TEMPORARY
☐ CLASS II ADMINISTRATIVE UPDATE ☐ AFTER-THE-FACT

PLEASE CHECK TYPE OF 45CSR30 (TITLE V) REVISION (IF ANY):

- ☐ ADMINISTRATIVE AMENDMENT ☐ MINOR MODIFICATION
☐ SIGNIFICANT MODIFICATION

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION
INFORMATION AS ATTACHMENT S TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options
(Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant (as registered with the WV Secretary of State's Office):
Ascent Resources – Marcellus, LLC

2. Federal Employer ID No. (FEIN):
46-5580354

3. Name of facility (if different from above):
WJ Criswell 405

4. The applicant is the:
☐ OWNER ☐ OPERATOR ☒ BOTH

5A. Applicant's mailing address:
PO Box 13678

Oklahoma City, OK 73113

5B. Facility's present physical address:
39.60737°N, -80.61828°W
Four Mile Road,
Wileyville, WV 26186

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☐ YES ☒ NO
– If YES, provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A**.
– If NO, provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A**.

7. If applicant is a subsidiary corporation, please provide the name of parent corporation:

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site*? ☒ YES ☐ NO

– If YES, please explain: Lease

– If NO, you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated or temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.): Natural gas production

10. North American Industry
Classification System
(NAICS) code for the facility:
211111

11A. DAQ Plant ID No. (for existing facilities only):
1 0 3 – 0 0 0 98

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers
associated with this process (for existing facilities only):
G70-A124B

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits**, please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

From Wileyville, WV, head south on Fairview Ridge Rd. toward WV-7 W. Turn left at the first cross street onto WV-7 E for 1.6 mi. Turn right onto Barker Run Rd. and go 3.6 mi. Turn left onto N Fork Rd and go 4.4 mi. Turn left onto Four Mile Rd. and go 0.9 mi to facility location.

12.B. New site address (if applicable):

12C. Nearest city or town:

12D. County:

Wileyville

Wetzel

12.E. UTM Northing (KM): 4,384.25

12F. UTM Easting (KM): 532.769

12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:

Ascent is removing one (1) natural gas-fired compressor engine and updating the production.

14A. Provide the date of anticipated installation or change: / /

- If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen:

14B. Date of anticipated Start-Up if a permit is granted:

 / /

14C. Provide a **Schedule** of the planned **Installation of/Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:

Hours Per Day 24

Days Per Week 7

Weeks Per Year 52

16. Is demolition or physical renovation at an existing facility involved? ☐ YES ☒ NO

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (*if known*). A list of possible applicable requirements is also included in Attachment D of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance (*if known*). Provide this information as **Attachment D**.

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to **Plot Plan Guidance**).

- Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F**.

23. Provide a **Process Description** as **Attachment G**.

- Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H**.

- For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I**.

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J**.

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K**.

28. Check all applicable **Emissions Unit Data Sheets** listed below:

- | | | |
|--|---|--|
| <input checked="" type="checkbox"/> Bulk Liquid Transfer Operations | <input checked="" type="checkbox"/> Haul Road Emissions | <input type="checkbox"/> Quarry |
| <input checked="" type="checkbox"/> Chemical Processes | <input type="checkbox"/> Hot Mix Asphalt Plant | <input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities |
| <input type="checkbox"/> Concrete Batch Plant | <input type="checkbox"/> Incinerator | <input checked="" type="checkbox"/> Storage Tanks |
| <input type="checkbox"/> Grey Iron and Steel Foundry | <input type="checkbox"/> Indirect Heat Exchanger | |
| <input checked="" type="checkbox"/> General Emission Unit, specify Fugitives | | |

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L**.

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

- | | | |
|--|---|--|
| <input type="checkbox"/> Absorption Systems | <input type="checkbox"/> Baghouse | <input checked="" type="checkbox"/> Flare |
| <input type="checkbox"/> Adsorption Systems | <input type="checkbox"/> Condenser | <input type="checkbox"/> Mechanical Collector |
| <input type="checkbox"/> Afterburner | <input type="checkbox"/> Electrostatic Precipitator | <input type="checkbox"/> Wet Collecting System |
| <input type="checkbox"/> Other Collectors, specify | | |

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M**.

30. Provide all **Supporting Emissions Calculations** as **Attachment N**, or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O**.

- Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and **Example Legal Advertisement** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ YES ☒ NO

- If **YES**, identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's "**Precautionary Notice – Claims of Confidentiality**" guidance found in the **General Instructions** as **Attachment Q**.

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

- | | |
|--|---|
| <input type="checkbox"/> Authority of Corporation or Other Business Entity | <input type="checkbox"/> Authority of Partnership |
| <input type="checkbox"/> Authority of Governmental Agency | <input type="checkbox"/> Authority of Limited Partnership |

Submit completed and signed **Authority Form** as **Attachment R**.

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. Certification of Information. To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative**, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____

(Please use blue ink)

DATE: _____

(Please use blue ink)

35B. Printed name of signee: Tim Cummings

35C. Title: VP-Operations

35D. E-mail: N/A

36E. Phone: N/A

36F. FAX: N/A

36A. Printed name of contact person (if different from above): Evan Foster Pearson

36B. Title: EH&S Air Compliance Specialist

36C. E-mail:
evan.pearson@ascentresources.com

36D. Phone: 405-252-7753

36E. FAX: N/A

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- ☒ Attachment A: Business Certificate
- ☒ Attachment B: Map(s)
- ☒ Attachment C: Installation and Start Up Schedule
- ☒ Attachment D: Regulatory Discussion
- ☒ Attachment E: Plot Plan
- ☒ Attachment F: Detailed Process Flow Diagram(s)
- ☒ Attachment G: Process Description
- ☒ Attachment H: Material Safety Data Sheets (MSDS)
- ☒ Attachment I: Emission Units Table
- ☒ Attachment J: Emission Points Data Summary Sheet

- ☒ Attachment K: Fugitive Emissions Data Summary Sheet
- ☒ Attachment L: Emissions Unit Data Sheet(s)
- ☒ Attachment M: Air Pollution Control Device Sheet(s)
- ☒ Attachment N: Supporting Emissions Calculations
- ☒ Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans
- ☒ Attachment P: Public Notice
- ☐ Attachment Q: Business Confidential Claims
- ☐ Attachment R: Authority Forms
- ☐ Attachment S: Title V Permit Revision Information
- ☒ Application Fee

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- ☐ Forward 1 copy of the application to the Title V Permitting Group and:
- ☐ For Title V Administrative Amendments:
 - ☐ NSR permit writer should notify Title V permit writer of draft permit,
- ☐ For Title V Minor Modifications:
 - ☐ Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,
 - ☐ NSR permit writer should notify Title V permit writer of draft permit.
- ☐ For Title V Significant Modifications processed in parallel with NSR Permit revision:
 - ☐ NSR permit writer should notify a Title V permit writer of draft permit,
 - ☐ Public notice should reference both 45CSR13 and Title V permits,
 - ☐ EPA has 45 day review period of a draft permit.

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

Source Aggregation Analysis

All equipment at the WJ Criswell 405 facility (Facility) is owned and operated by Ascent Resources – Marcellus, LLC (Ascent) and has been included in this application.

Traditionally, source aggregation has been determined based on a “three-prong” approach, including:

1. SIC Code: Surrounding or associated sources belong to the same 2-digit industrial grouping (2-digit SIC code) as this facility, OR surrounding or associated sources that belong to different 2-digit SIC codes are support facilities for this source.
2. Common Ownership or Control: Surrounding or associated sources are under common ownership or control as this source.
3. Contiguous or Adjacent: Surrounding or associated sources are contiguous or adjacent with this source.

On June 3, 2016, the United States Environmental Protection Agency (US EPA) finalized a rule clarifying oil and gas source aggregation at major sources. The final rule states that sources shall be aggregated if they are:

1. Under Common Control,
2. Located within ¼ mile of one another (measured from the center of the equipment on the surface site), and
3. Share Equipment (including, but not limited to, produced fluids storage tanks, phase separators, natural gas dehydrators or emissions control devices)

While states are not required to implement this definition, it provides additional reference in determining source aggregation.

Ascent has determined that there are currently no additional sources under the same SIC, under common control, contiguous or adjacent to this Facility, within a quarter (¼) mile of the Facility, or that share equipment; therefore any additional source aggregation analysis is not required.

Attachment A: Business Certificate

State of West Virginia



Certificate

*I, Natalie E. Tennant, Secretary of State of the
State of West Virginia, hereby certify that*

the attached true and exact copy of the Articles of Amendment to the Articles of Organization of

AMERICAN ENERGY-MARCELLUS, LLC

are filed in my office, signed and verified, as required by the provisions of West Virginia Code
§31B-2-204 and conform to law. Therefore, I issue this

CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the limited liability company to

ASCENT RESOURCES - MARCELLUS, LLC

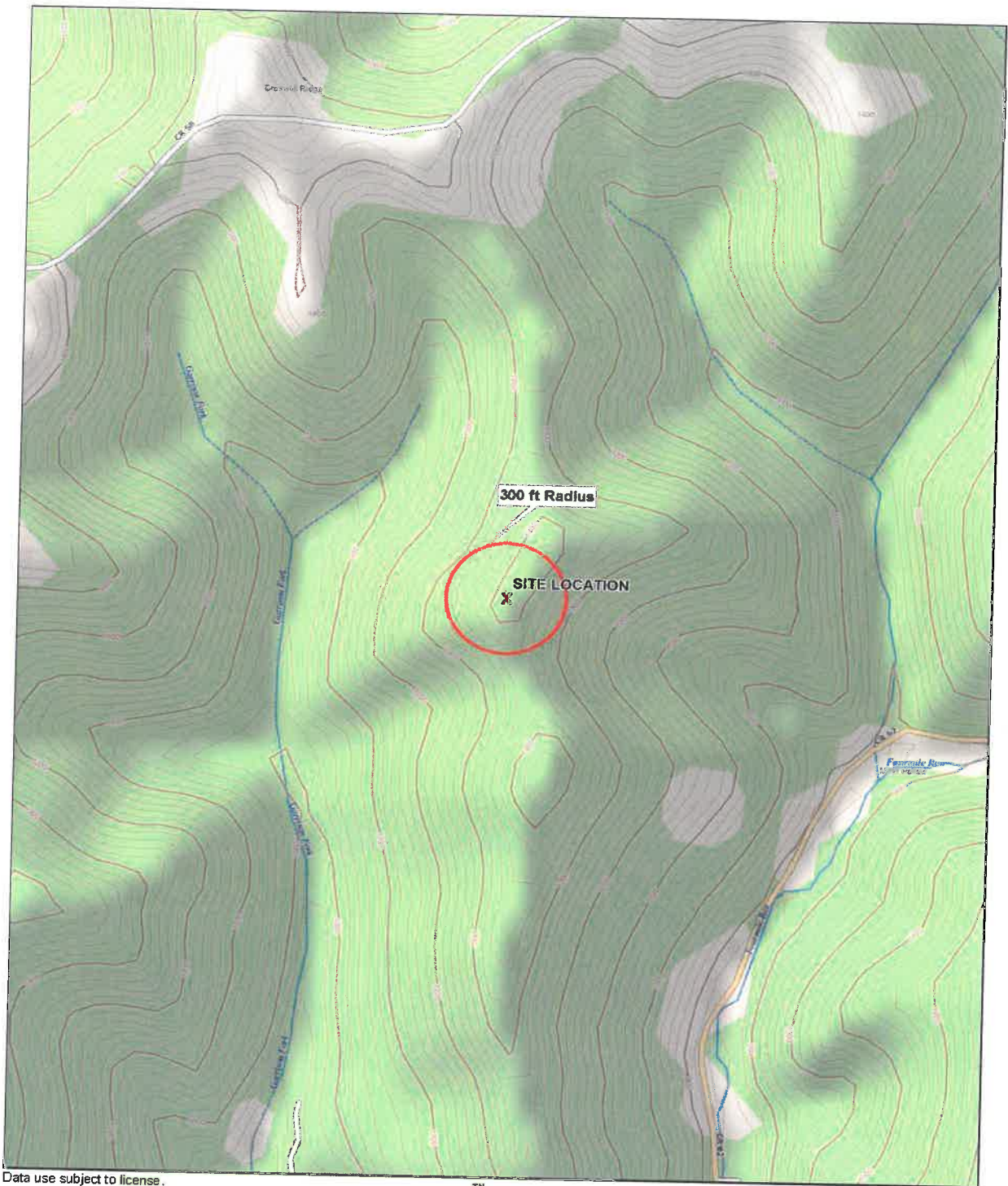


*Given under my hand and the
Great Seal of the State of
West Virginia on this day of
July 9, 2015*

Natalie E. Tennant

Secretary of State

Attachment B: Map(s)



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www.delorme.com



1015 N. Broadway, Suite 300
Oklahoma City, OK 73102
(405) 842-1066

www.eccgrp.com

FIGURE TITLE

AREA MAP

DOCUMENT TITLE

RULE 13 CONSTRUCTION APPLICATION

CLIENT

ASCENT RESOURCES – MARCELLUS, LLC

LOCATION

**WJ CRISWELL 405 FACILITY
WETZEL COUNTY, WEST VIRGINA**

DATE 10/18/2016

SCALE AS SHOWN

DESIGNED BY AD

APPROVED BY LWL

DRAWN BY AD

PROJECT NUMBER

ARMAWV0001

ATTACHMENT

B

Attachment C: Installation and Start-Up Schedule

Installation and Start-up Schedule

Equipment	Unit ID	Installation Date	Startup Date
HiPower PSI/GM 3.0L Generator (47 Hp)	9E	2015	2015
Gas Production Unit (1.50 MMBtu/hr)	1E	2015	2015
Gas Production Unit (1.50 MMBtu/hr)	2E	2015	2015
Gas Production Unit (1.50 MMBtu/hr)	3E	2015	2015
Line Heater (1.50 MMBtu/hr)	4E	2015	2015
Flash Separator Heater (1.00 MMBtu/hr)	7E	2015	2015
Condensate Stabilizer Heater (0.75 MMBtu/hr)	11E	2015	2015
Condensate Storage Tank (400-bbl)	15E (CTK-1)	2015	2015
Condensate Storage Tank (400-bbl)	16E (CTK-2)	2015	2015
Condensate Storage Tank (400-bbl)	17E (CTK-3)	2015	2015
Produced Water Storage Tank (400-bbl)	18E (PTK-1)	2015	2015
Produced Water Storage Tank (400-bbl)	19E (PTK-2)	2015	2015
Produced Water Storage Tank (400-bbl)	20E (PTK-3)	2015	2015
Enclosed Combustor (18.42 MMBtu/hr)	10E	2015	2015
Condensate Truck Loading	12E	2015	2015
Produced Water Truck Loading	13E	2015	2015
Sitewide Fugitive	14E	2015	2015
Unpaved Road Sources	21E	2015	2015

Attachment D: Regulatory Discussion

Applicable State Requirements

45CSR6 CONTROL OF AIR POLLUTION FROM COMBUSTION OF REFUSE

Ascent is applying for a permit to authorize the operation of the flare that will be used on site to control the storage tanks. Ascent will comply with all requirements of this rule.

45CSR13 PERMITS FOR CONSTRUCTION, MODIFICATION, RELOCATION AND OPERATION OF STATIONARY SOURCES OF AIR POLLUTANTS, NOTIFICATION REQUIREMENTS, ADMINISTRATIVE UPDATES, TEMPORARY PERMITS, GENERAL PERMITS, PERMISSION TO COMMENCE CONSTRUCTION, AND PROCEDURES FOR EVALUATION

Ascent is submitting this application in accordance with this rule. Ascent will comply with all requirements of this rule.

Applicable Federal Requirements

40 CFR PART 60 NEW SOURCE PERFORMANCE STANDARDS (NSPS) SUBPART OOOO/OOOOa

The storage tanks were constructed after August 23, 2011, however a federally enforceable limit of less than six (6) tons per year (TPY) was requested in the previous permits. Therefore, the storage tanks are not affected equipment under this subpart for the Facility. In addition, no other equipment or modifications at the Facility trigger NSPS Subpart OOOO or OOOOa at this time.

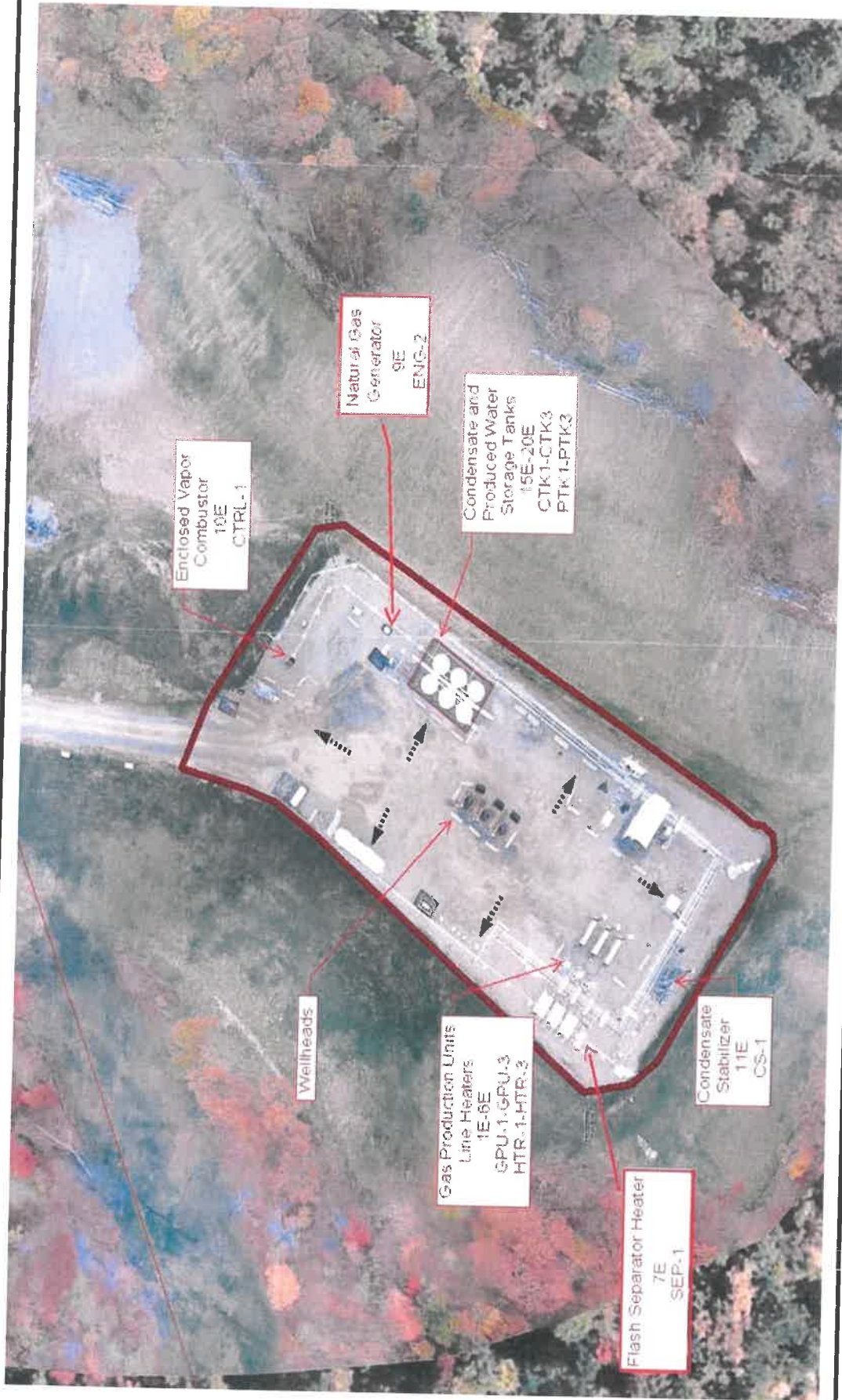
40 CFR PART 60 NSPS SUBPART JJJJ


The natural gas-fired generator (ENG-2), which is rated at 47 horsepower (Hp), was manufactured and constructed after July 1, 2008. Therefore, the Facility is subject to NSPS Subpart JJJJ and NESHAP Subpart ZZZZ. Specifically, ENG-2 is subject to the emission limitations of Table 3 of the preamble to the final rule for NSPS Subpart JJJJ as published in the Federal Register dated January 18, 2008. In accordance with the rule, Ascent will maintain documentation from the manufacturer that PUMP1 is certified to meet the applicable emission limitations.

40 CFR PART 63 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP) SUBPART ZZZZ

NESHAP Subpart ZZZZ has no additional requirements for area sources. Ascent is complying with NESHAP Subpart ZZZZ by complying with NSPS Subpart JJJJ for ENG-2.

Attachment E: Plot Plan



 ENVIRO CLEAN CARDINAL 1015 N. BROADWAY SUITE 300 OKLAHOMA CITY, OK 73102 www.ecgrp.com	FIGURE TITLE		DATE	10/27/2016
	PLOT PLAN		SCALE	NOT TO SCALE
	DOCUMENT TITLE		DESIGNED BY	AD
	RULE 13 CONSTRUCTION APPLICATION		APPROVED BY	LWL
	CLIENT		DRAWN BY	AD
	ASCENT RESOURCES, LLC		PROJECT NUMBER	
	LOCATION		ARMAWV0001	
WJ CRISWELL 405 FACILITY WETZEL COUNTRY, WEST VIRGINIA		ATTACHMENT	E	

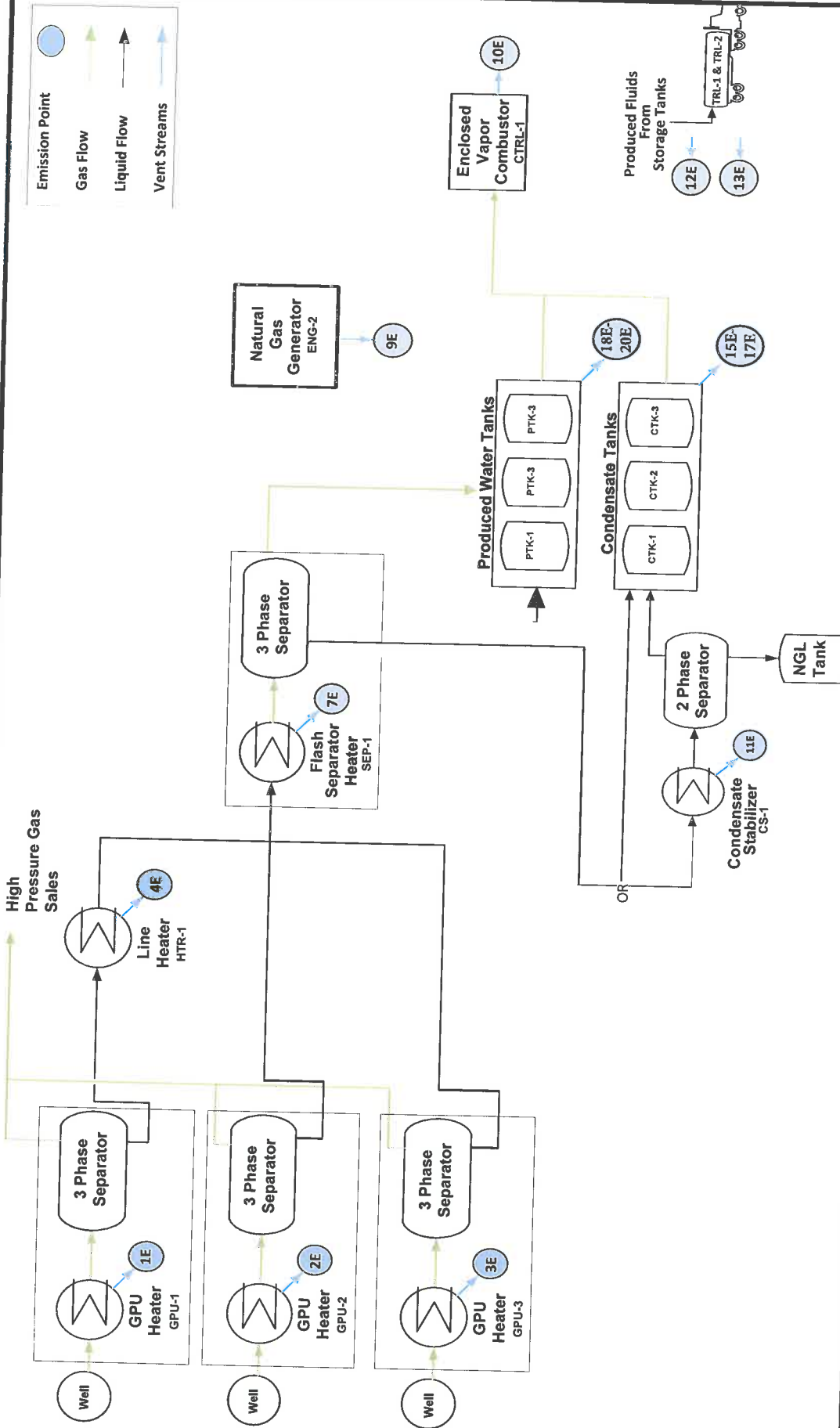
PLOT PLAN

RULE 13 CONSTRUCTION APPLICATION

ASCENT RESOURCES, LLC

WJ CRISWELL 405 FACILITY
WETZEL COUNTRY, WEST VIRGINIA

Attachment F: Detailed Process Flow Diagram(s)



1015 N. BROADWAY
SUITE 300
OKLAHOMA CITY, OK 73102

www.ecgrp.com

FIGURE TITLE

PROCESS FLOW DIAGRAM

DOCUMENT TITLE

RULE 13 CONSTRUCTION APPLICATION

CLIENT

ASCENT RESOURCES, LLC

LOCATION

WJ CRISWELL 405 FACILITY
WETZEL COUNTY, WEST VIRGINA

DATE

10/21/2016

SCALE

NOT TO SCALE

DESIGNED BY

AD

APPROVED BY

LWL

DRAWN BY

AD

PROJECT NUMBER

ARMAWV0001

FIGURE NUMBER

F

Attachment G: Process Description

Process Description

Natural gas, condensate, and produced water flow from the three (3) wellheads located on the WJ Criswell 405 Facility. In this application, Ascent is removing one (1) natural gas-fired compressor engine and updating production estimates at the Facility.

The inlet streams are first routed through the three (3) 1.5 million British thermal units per hour (MMBtu/hr) gas production units (GPUs) (GPU-1 to GPU-3) where the first stage of fluid separation occurs. The GPUs separate the well stream flow into a high pressure natural gas sales stream and condensate liquid stream. In the second stage of separation, the liquid streams are routed through three (3) 1.5 MMBtu/hr line heaters (HTR-1 to HTR-3) to aid in the downstream separation process.

The fluids are then routed to the 1.0 MMBtu/hr low pressure flash separator heater (SEP-1) where condensate and produced water are separated. The flash from the low pressure separator is sent to the storage tanks, which are controlled by an enclosed combustor (CTRL-1). Produced water from the flash separator is routed to three (3) 400-bbl produced water storage tanks (PTK-1 to PTK-3). The condensate from the flash separator is typically routed to the three (3) 400-bbl condensate storage tanks (CTK-1 to CTK-3).

The natural gas stream will exit the facility for transmission via pipeline. Condensate and produced water are transported offsite via tank truck (TRL-1 and TRL-2). Flashing, working, and breathing, emissions from the three (3) 400-bbl produced water storage tanks and three (3) 400-bbl condensate storage tanks will be routed to the enclosed combustion device (CTRL-1).

Ascent requests to maintain the permitted 1,200 bbl/day condensate stabilizer with a 0.75 MMBtu/hr burner assembly (CS-1). The condensate stabilizer raises the temperature of the condensate and drives off hydrocarbons. These hydrocarbons are then transferred under pressure to the natural gas liquids (NGL) tank on site. The depleted condensate stream is transferred to the three (3) 400-bbl condensate storage tanks.

Based upon current observed daily condensate production, Ascent does not expect the quantity of condensate production that would justify the operation of the condensate stabilizer. Ascent is filling this application to account for the loading of the condensate tank directly from the flash separator. At this time, Ascent requests that the condensate stabilizer remain an authorized emission source. With this permitting approach, Ascent is reasonably conservative in its permitting actions and has the authorization to operate the condensate stabilizer should field conditions deem it necessary.

One (1) 47 horsepower (Hp) Hipower prime-power natural gas generator (ENG-2) is located on-site for Facility electrical generation.

Attachment H: Material Safety Data Sheets (MSDS)

Section 1: Identification of the substance or mixture and of the supplier

Product Name: Natural Gas Liquids
SDS Number: 786340

Synonyms/Other Means of Identification: Natural Gas Liquids, Raw
Natural Gas Liquids, Ethane Free
Plant Condensate
Raw NGL
EPBC Mix
PBC Mix
Y-Grade
Gas Liquids

MARPOL Annex I Category: Naphthas and Condensates
Intended Use: Feedstock

Manufacturer: Ascent Resources
3501 N.W. 63rd
Oklahoma City, OK 73116

Emergency Health and Safety Number: Chemtrec: 800-424-9300 (24 Hours)

SDS Information: Phone: 800-642-3074
URL: www.ascentresources.com

Section 2: Hazard(s) Identification

Classification

H224 – Flammable liquids – Category 1
H315 – Skin corrosion/irritation – Category 2
H304 – Aspiration Hazard – Category 1
H336 – Specific target organ toxicity (single exposure) – Category 3
H350 – Carcinogenicity – Category 1B
H411 – Hazardous to the aquatic environment, chronic toxicity – Category 2

Hazards not Otherwise Classified

May contain or release poisonous hydrogen sulfide gas

Label Elements



DANGER

Extremely flammable liquid and vapor. (H224)*
Causes skin irritation. (H315)*
May contain or release poisonous hydrogen sulfide gas
May be fatal if swallowed and enters airways. (H304)*
May cause drowsiness or dizziness. (H336)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H411)*

Precautionary Statement(s):

Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210)*
Keep container tightly closed. (P233)*
Ground/bond container and receiving equipment. (P240)*
Use with explosion-proof equipment. (P241)*
Use only non-sparking tools. (P242)*
Take precautionary measures against static discharge. (P243)*
Avoid breathing dust/fume/gas/mist/vapours/spray. (P261)*
Wash thoroughly after handling. (P264)*
Use only outdoors or in a well-ventilated area. (P271)*
Wear protective gloves / protective clothing / eye protection / face protection. (P280)*
IF ON SKIN: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. (P303+P361+P353)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction. (P370+P378)*
If skin irritation occurs: Get medical advice/attention. (P313)*
Take off contaminated clothing and wash before reuse. (P362)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P310)*
Do NOT induce vomiting. (P331)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P304+P340)*
Call a POISON CENTER or doctor/physician if you feel unwell. (P312)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction. (P370+P378)*
Store in a well-ventilated place. Keep cool. (P403+P235)*
Store locked up. (P405)*
Dispose of contents/container to approved disposal facility. (P501)*

* (Applicable GHS hazard code.)

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration ¹
Natural gas (petroleum), raw liq. mix	64741-48-6	100
n-Hexane	110-54-3	5-25
Benzene	71-43-2	0.1-5
Hydrogen Sulfide	7783-06-4	<1
Total Sulfur: > 0.5 wt%		

¹ All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing, and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops, seek medical attention. Wash contaminated clothing before reuse.

Inhalation (Breathing): If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Animal studies suggest that nitrites are a useful antidote, however, documentation of the efficacy of nitrites in humans is lacking. If the diagnosis of hydrogen sulfide poisoning is confirmed and if the patient does not respond rapidly to supportive care, the use of nitrites may be an effective antidote if delivered within the first few minutes of exposure. For adults the dose is 10 mL of a 3% NaNO₂ solution (0.5 gm NaNO₂ in 15 mL water) I.V. over 2-4 minutes. The dosage should be adjusted in children or in the presence of anemia, and methemoglobin levels, arterial blood gases, and electrolytes should be monitored closely.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Other Comments: Before attempting rescue, first responders should be alert to the possible presence of hydrogen sulfide, a poisonous gas with the smell of rotten eggs, and should consider the need for respiratory protection (see Section 8). Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Consider whether oxygen administration is needed. Obtain medical advice for further treatment.

Section 5: Fire-Fighting Measures



NFPA 704 Hazard Class

Health: 1 Flammability: 4 Instability: 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: Extremely flammable. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Hazardous combustion/decomposition products, including hydrogen sulfide, may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Hydrogen sulfide and oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. May contain or release poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H₂S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Nonsparking tools should be used. May contain or release dangerous levels of hydrogen sulfide. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing vapors or mists. Use only outdoors or in well-ventilated area. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Static Accumulation Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding of tanks, transfer piping, and storage tank level floats are necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. Special care should be given to ensure that special slow load procedures for "switch loading" are followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha). For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Conditions for safe storage: This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H₂S, and flammability prior to entry. Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Natural gas (petroleum), raw liq. mix	TWA: 300 ppm (as Gasoline)	TWA: 400 mg/m ³ TWA: 100 ppm	0.5 ppm TWA8hr (as benzene) 0.25 ppm TWA12hr (as benzene) 2.5 ppm STEL (as benzene) (American Energy Guidelines)
n-Hexane	TWA: 50 ppm Skin	TWA: 500 ppm TWA: 1800 mg/m ³	---
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 10 ppm TWA: 1 ppm	---
Hydrogen Sulfide	STEL: 5 ppm TWA: 1 ppm	Ceiling: 20 ppm	TWA: 5 ppm 8hr TWA: 2.5 ppm 12hr STEL: 15 ppm (American Energy Guidelines)

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Depending on exposure and use conditions, additional protection may be necessary to prevent skin contact including use of items such as chemical resistant boots, aprons, arm covers, hoods, coveralls, or encapsulated suits. Suggested protective materials: Nitrile

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Colorless
Physical Form:	Liquid
Odor:	Gasoline; Rotten egg / sulfurous
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	150 - 200 psia (Reid VP) @ 100°F / 37.8°C
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	No data
Melting/Freezing Point:	No data
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	(estimated) 0.5 - 0.7 @ 68°F / 20°C
Percent Volatile:	100%
Evaporation Rate (nBuAc=1):	No data
Flash Point:	< -99 °F / < -73 °C
Test Method:	(estimate)
Lower Explosive Limits (vol % in air):	No data
Upper Explosive Limits (vol % in air):	No data
Auto-ignition Temperature:	No data

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Expected to have a low degree of toxicity by inhalation	May contain or release poisonous hydrogen sulfide gas - see Other Comments.	> 5.2 mg/L (vapor)
Skin Absorption	Unlikely to be harmful		> 2 g/kg
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg

Aspiration Hazard: May be fatal if swallowed and enters airways.

Skin Corrosion/Irritation: Causes skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation. .

Signs and Symptoms: Effects of overexposure can include slight irritation of the respiratory tract, nausea, vomiting, and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued exposure to high concentrations can result in vomiting, cardiac irregularities and sudden loss of consciousness.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: May cause cancer Based on component information.

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Other Comments: This material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Information on Toxicological Effects of Components

Natural gas (petroleum), raw liq. mix

Carcinogenicity: Two year inhalation studies of vaporized unleaded gasoline produced an increased incidence of kidney tumors in male rats and liver tumors in female mice. Repeated skin application of various petroleum naphthas in mice for two years resulted in an increased incidence of skin tumors but only in the presence of severe skin irritation. Follow-up mechanistic studies suggest that the occurrence of these tumors may be the consequence of promotional processes and not relevant to human risk assessment. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer from gasoline exposure. Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.

Target Organs: Two year inhalation studies of wholly vaporized unleaded gasoline, and 90 days studies of various petroleum naphthas, did not produce significant target organ toxicity in laboratory animals. Nephropathy in male rats, characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules was observed, however follow-up studies suggest that these changes are unique to the male rat.

Reproductive Toxicity: No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two-generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development.

n-Hexane

Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone.

Reproductive Toxicity: Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200 ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.

Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.

Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased fetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No fetal toxicity was seen at doses that were not maternally toxic. Decreased sperm counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abusers who directly inhale toluene during pregnancy.

Cyclohexane

Reproductive Toxicity: Two-generation reproduction and developmental toxicity studies using rats and rabbits exposed (whole-body) to atmospheric concentrations up to 7000 ppm cyclohexane did not detect evidence of developmental toxicity in either species.

Section 12: Ecological Information

Toxicity: Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/L and mostly in the range 1-100 mg/L. These tests were carried out on water accommodated fractions, in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition. These substances should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment. Classification: H411; Chronic Cat 2.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by microorganisms.

Persistence per IOPC Fund definition: Non-Persistent

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material range from 3 to greater than 6 and therefore are regarded as having the potential to bioaccumulate. In practice, metabolic processes or physical properties may prevent this effect or limit bioavailability.

Mobility in Soil: On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilization to air. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 6.5 days for benzene to 0.5 days for n-dodecane.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D001 - Ignitability characteristic
- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping Description:

If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:
UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., 2.1; ,
If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:
UN3295, Hydrocarbons, liquid, n.o.s., 3, I or II [I if BP < 95° F (35° C); II if BP > 95° F]

Non-Bulk Package Marking:

Must be consistent with shipping description, either:
Hydrocarbon gas mixture, liquefied, n.o.s., UN1965
or
Hydrocarbons, liquid, n.o.s., UN3295

Non-Bulk Package Labeling:

For UN1965: Flammable gas
For UN3295: Flammable liquid

Bulk Package/Placard Marking:

For UN1965: Flammable gas / 1965
For UN3295: Flammable / 3295

Packaging - References:

For UN1965: 49 CFR: 173.306; 173.304; 173.314 & .315
For UN3295: 49 CFR 173.150; 173.201; 173.243 [**PG I**]
-or-
49 CFR 173.150; 173.202; 173.242 [**PG II**]
(*Exceptions; Non-bulk; Bulk*)

Hazardous Substance:

**Emergency Response Guide:
Note:**

See Section 15 for RQ's
UN1965 - 115; UN3295 - 128;
The following alternate shipping description order may be used until January 1, 2013:
Proper Shipping name, Hazard Class or Division, (Subsidiary Hazard if any), UN or NA number, Packing Group
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable
Other shipping description elements may be required for DOT compliance.

International Maritime Dangerous Goods (IMDG)

Shipping Description:

If boiling point is < 20° C shipping description is:
UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., (Propane , Butane), 2.1
If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:
UN3295, Hydrocarbons, liquid, n.o.s., 3, I or II (FP° C cc), [where FP is the material's flash point in degrees C cc.]
[I if BP < 95° F (35° C); II if BP > 95° F];

Non-Bulk Package Marking:

Must be consistent with shipping description, either:
Hydrocarbon gas mixture, liquefied, n.o.s., (Propane, Butane), UN1965
or
Hydrocarbons, liquid, n.o.s., UN3295

Labels:

For UN1965: Flammable gas
For UN3295: Flammable liquid

Placards/Marking (Bulk):

For UN1965: Flammable gas / 1965
For UN3295: Flammable / 3295

Packaging - Non-Bulk:

For UN1965: P200
For UN3295: P001

EMS:

For UN1965: F-D, S-U
For UN3295: F-E, S-D

Note:

If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I.

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #: UN1965 or UN3295

Proper Shipping Name: For UN1965: Hydrocarbon gas mixture, liquefied, n.o.s. (Propane, Butane)
For UN3295: Hydrocarbons, liquid, n.o.s.

Hazard Class/Division: For UN1965: 2.1
For UN3295: 3

Subsidiary risk: None
Packing Group: For UN1965: None
For UN3295: I or II [Determined by IATA 3.3.2]

Non-Bulk Package Marking: For UN1965: Hydrocarbon gas mixture, liquefied, n.o.s. (Propane, Butane), UN1965
For UN3295: Hydrocarbons, liquid, n.o.s., UN3295

Labels: For UN1965: Flammable gas, Cargo Aircraft Only
For UN3295: Flammable liquid

ERG Code: For UN1965: 10L or For UN3295: 3H

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	UN1965 - Forbidden UN3295 - Forbidden - [PG I] Y341 - [PG II]	UN1965 - Forbidden UN3295 - 351 - [PG I] 353 - [PG II]	UN1965 - 200 UN3295 - 361 - [PG I] 364 - [PG II]
Max. Net Qty. Per Package:	UN3295 - Forbidden - [PG I] 1L - [PG II]	UN3295 - 1L - [PG I] 5 L - [PG II]	UN1965 - 150 kg UN3295 - 30 L - [PG I] 60 L - [PG II]

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:

Component	TPQ	EPCRA RQ
Hydrogen Sulfide	500 lb	100 lb

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health: Yes
Chronic Health: Yes
Fire Hazard: Yes
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration ¹	de minimis
n-Hexane	5-25	1.0%
Toluene	1-5	1.0%
Benzene	0.1-5	0.1%
Cyclohexane	0-3	1.0%

EPA (CERCLA) Reportable Quantity (in pounds):

EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:

Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Type of Toxicity
Toluene	Developmental Toxicant Female Reproductive Toxicant
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant

International Hazard Classification

Canada:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:

B2 - Flammable Liquids

D2A

D2B

National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: EAR99

Section 16: Other Information

Date of Issue:	1-Sep-2015
Status:	FINAL
Previous Issue Date:	1-Sep-2015
Revised Sections or Basis for Revision:	Identified Hazards (Section 2) Precautionary Statement(s) (Section 2) First Aid (Section 4)Exposure limits (Section 8) Shipping information (Section 14) Regulatory information (Section 15)
SDS Number:	786340

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and Implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Crude Condensate
SDS Number:	730370
Synonyms/Other Means of Identification:	Natural Gas Condensates, Petroleum Crude Oil Condensate Gas Drips
MARPOL Annex I Category:	Naphthas and Condensates
Intended Use:	Feedstock
Manufacturer:	Ascent Resources 3501 N.W. 63rd Oklahoma City, OK 73116
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours)
SDS Information:	Phone: 800-642-3074 URL: www.ascentresources.com

Section 2: Hazard(s) Identification

Classification

H224 -- Flammable liquids -- Category 1
H304 -- Aspiration Hazard -- Category 1
H315 -- Skin corrosion/irritation -- Category 2
H332 -- Acute toxicity, Inhalation -- Category 4
H336 -- Specific target organ toxicity (single exposure) -- Category 3
H350 -- Carcinogenicity -- Category 1B
H411 -- Hazardous to the aquatic environment, chronic toxicity -- Category 2

Hazards not Otherwise Classified

May contain or release poisonous hydrogen sulfide gas

Label Elements



DANGER

Extremely flammable liquid and vapor. (H224)*
Causes skin irritation. (H315)*
May be fatal if swallowed and enters airways. (H304)*
Contains poisonous hydrogen sulfide gas
Harmful if inhaled. (H332)*
May cause drowsiness or dizziness. (H336)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H411)*

Precautionary Statement(s):

Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210)*
Keep container tightly closed. (P233)*
Keep cool. (P235)*
Ground/bond container and receiving equipment. (P240)*
Use with explosion-proof equipment. (P241)*
Use only non-sparking tools. (P242)*
Take precautionary measures against static discharge. (P243)*
Avoid breathing dust/fume/gas/mist/vapours/spray. (P261)*
Wash thoroughly after handling. (P264)*
Use only outdoors or in a well-ventilated area. (P271)*
Avoid release to the environment. (P273)*
Wear protective gloves / protective clothing / eye protection / face protection. (P280)*
IF ON SKIN: Remove/Take off immediately all contaminated clothing. (P361)* Wash with plenty of soap and water. (P352)*
If skin irritation occurs: Get medical advice/attention. (P313)*
Take off contaminated clothing and wash before reuse. (P362)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P340)*
Call a POISON CENTER or doctor/physician if you feel unwell. (P312)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P310)*
Do NOT induce vomiting. (P331)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
Collect spillage. (P391)*
Store locked up. (P405)*
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)*
Dispose of contents/container to approved disposal facility. (P501)*

* (Applicable GHS hazard code.)

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration ¹
Natural Gas Condensate ..C2-20	64741-47-5	100
Toluene	108-88-3	1-7
Hydrogen Sulfide	7783-06-4	0.1-5
Benzene	71-43-2	<5

¹ All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Crude oil, natural gas and natural gas condensate can contain minor amounts of sulfur, nitrogen and oxygen containing organic compounds as well as trace amounts of heavy metals like mercury, arsenic, nickel, and vanadium. Composition can vary depending on the source of crude.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing, and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops, seek medical attention. Wash contaminated clothing before reuse.

Inhalation (Breathing): Immediately move victim away from exposure and into fresh air in a position comfortable for breathing. If respiratory symptoms or other symptoms of exposure develop, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Animal studies suggest that nitrites are a useful antidote, however, documentation of the efficacy of nitrites in humans is lacking. If the diagnosis of hydrogen sulfide poisoning is confirmed and if the patient does not respond rapidly to supportive care, the use of nitrites may be an effective antidote if delivered within the first few minutes of exposure. For adults the dose is 10 mL of a 3% NaNO₂ solution (0.5 gm NaNO₂ in 15 mL water) I.V. over 2-4 minutes. The dosage should be adjusted in children or in the presence of anemia, and methemoglobin levels, arterial blood gases, and electrolytes should be monitored closely.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Other Comments: Before attempting rescue, first responders should be alert to the possible presence of hydrogen sulfide, a poisonous gas with the smell of rotten eggs, and should consider the need for respiratory protection (see Section 8). Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Consider whether oxygen administration is needed. Obtain medical advice for further treatment.

Section 5: Fire-Fighting Measures



NFPA 704 Hazard Class

Health: 2 Flammability: 4 Instability: 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: Extremely flammable. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Hazardous combustion/decomposition products, including hydrogen sulfide, may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Hydrogen sulfide and oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Contains poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H₂S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Nonsparking tools should be used. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Wear protective gloves/clothing and eye/face protection. May contain or release dangerous levels of hydrogen sulfide. Use only outdoors or in well-ventilated area. Avoid breathing vapors or mists. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Mercury and other heavy metals may be present in trace quantities in crude oil, raw natural gas, and condensates. Production and processing of these materials can lead to "drop-out" of elemental mercury in enclosed vessels and pipe work, typically at the low point of any process equipment because of its density. Mercury may also occur in other process system deposits such as sludges, sands, scales, waxes, and filter media. Personnel engaged in work with equipment where mercury deposits might occur (confined space entry, sampling, opening drain valves, draining process lines, etc), may be exposed to a mercury hazard (see sections 3 and 8).

Static Accumulation Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding of tanks, transfer piping, and storage tank level floats are necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. Special care should be given to ensure that special slow load procedures for "switch loading" are followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha). For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Conditions for safe storage: This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H₂S, and flammability prior to entry. Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Natural Gas Condensate ..C2-20	TWA: 300 ppm (as Gasoline)	TWA: 400 mg/m ³ TWA: 100 ppm	0.5 ppm TWA8hr (as benzene) 0.25 ppm TWA12hr (as benzene) 2.5 ppm STEL (as benzene) (American Energy Guidelines)
Toluene	TWA: 20 ppm	Ceiling: 300 ppm TWA: 200 ppm	---
Hydrogen Sulfide	STEL: 5 ppm TWA: 1 ppm	Ceiling: 20 ppm	TWA: 5 ppm 8hr TWA: 2.5 ppm 12hr STEL: 15 ppm (American Energy Guidelines)
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 10 ppm TWA: 1 ppm	---

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Depending on exposure and use conditions, additional protection may be necessary to prevent skin contact including use of items such as chemical resistant boots, aprons, arm covers, hoods, coveralls, or encapsulated suits. Suggested protective materials: Nitrile

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Workplace monitoring plans should consider the possibility that heavy metals such as mercury may concentrate in processing vessels and equipment presenting the possibility of exposure during various sampling and maintenance operations. Implement appropriate respiratory protection and the use of other protective equipment as dictated by monitoring results (See Sections 2 and 7).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Amber to dark brown
Physical Form:	Liquid
Odor:	Rotten egg / sulfurous; Petroleum.
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	5-15 psia (Reid VP) @ 100°F / 37.8°C
Vapor Density (air=1):	1
Initial Boiling Point/Range:	-20 to 800 °F / -29 to 427 °C
Melting/Freezing Point:	No data
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	0.6 - 0.8 @ 60°F (15.6°C)
Bulk Density:	6.25 lbs/gal
VOC Content(%):	50
Evaporation Rate (nBuAc=1):	1
Flash Point:	-51 °F / -46 °C
Test Method:	Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Lower Explosive Limits (vol % in air):	1.1
Upper Explosive Limits (vol % in air):	6.0
Auto-ignition Temperature:	590 °F / 310 °C

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

<u>Acute Toxicity</u>	<u>Hazard</u>	<u>Additional Information</u>	<u>LC50/LD50 Data</u>
Inhalation	Harmful if inhaled	Contains poisonous hydrogen sulfide gas. See Signs and Symptoms.	10 mg/L (vapor, estimated)
Skin Absorption	Unlikely to be harmful		> 2 g/kg
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg

Aspiration Hazard: May be fatal if swallowed and enters airways.

Skin Corrosion/Irritation: Causes skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation.

Signs and Symptoms: Effects of overexposure can include slight irritation of the respiratory tract, nausea, vomiting, and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued exposure to high concentrations can result in vomiting, cardiac irregularities and sudden loss of consciousness.

This material contains hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: May cause cancer

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Information on Toxicological Effects of Components

Natural Gas Condensate ..C2-20

Carcinogenicity: Two year inhalation studies of vaporized unleaded gasoline produced an increased incidence of kidney tumors in male rats and liver tumors in female mice. Repeated skin application of various petroleum naphthas in mice for two years resulted in an increased incidence of skin tumors but only in the presence of severe skin irritation. Follow-up mechanistic studies suggest that the occurrence of these tumors may be the consequence of promotional processes and not relevant to human risk assessment. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer from gasoline exposure. Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.

Target Organs: Two year inhalation studies of wholly vaporized unleaded gasoline, and 90 days studies of various petroleum naphthas, did not produce significant target organ toxicity in laboratory animals. Nephropathy in male rats, characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules was observed, however follow-up studies suggest that these changes are unique to the male rat.

Reproductive Toxicity: No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two-generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development.

Xylenes

Target Organs: Rats exposed to xylenes at 800, 1000 or 1200 ppm 14 hours daily for 6 weeks demonstrated high frequency hearing loss. Another study in rats exposed to 1800 ppm 8 hours daily for 5 days demonstrated middle frequency hearing loss.

Reproductive Toxicity: Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions, but no evidence of teratogenicity.

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200 ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.

Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.

Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased fetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No fetal toxicity was seen at doses that were not maternally toxic. Decreased sperm counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abusers who directly inhale toluene during pregnancy.

Cyclohexane

Reproductive Toxicity: Two-generation reproduction and developmental toxicity studies using rats and rabbits exposed (whole-body) to atmospheric concentrations up to 7000 ppm cyclohexane did not detect evidence of developmental toxicity in either species.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

n-Hexane

Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone.

Reproductive Toxicity: Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Ethyl Benzene

Carcinogenicity: Rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study demonstrated limited evidence of kidney, liver, and lung cancer. Ethyl benzene has been listed as a possible human carcinogen by IARC.

Target Organs: In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilic foci, hypertrophy, necrosis), lung (alveolar epithelium metaplasia), thyroid (hyperplasia), thyroid (hyperplasia) and pituitary (hyperplasia). In animal models (particularly rats), ethyl benzene affects the auditory function mainly in the cochlear mid-frequency range and ototoxicity was observed after combined exposure to noise and ethyl benzene. There is no evidence of either ethyl benzene-induced hearing losses or ototoxicity with combined exposure to ethyl benzene and noise in workers.

Section 12: Ecological Information

Toxicity: Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/L and mostly in the range 1-100 mg/L. These tests were carried out on water accommodated fractions, in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition. These substances should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment. Classification: H411; Chronic Cat 2.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by microorganisms.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material range from 3 to greater than 6 and therefore are regarded as having the potential to bioaccumulate. In practice, metabolic processes or physical properties may prevent this effect or limit bioavailability.

Mobility in Soil: On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilization to air. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 6.5 days for benzene to 0.5 days for n-dodecane.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D001 - Ignitability characteristic
- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping Description:

If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is > 8.8 molar % shipping description is:

UN3160, Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulfide; ,; Liquefied Petroleum Gas), 2.3;; (2.1), Inhalation Hazard Zone **X**

If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:

UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., 2.1

If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:

UN1267, Petroleum crude oil, 3, I or II [I if BP < 35° C (95° F); II if BP > 35° C]

Non-Bulk Package Marking:

Must be consistent with shipping description, either:

Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulfide, Liquefied petroleum gas), UN3160

or

Hydrocarbon gas mixture, liquefied, n.o.s., UN1965

or

Petroleum crude oil, UN1267

Non-Bulk Package Labeling:

For UN3160: Poison gas and Flammable gas

For UN1965: Flammable gas

For UN1267: Flammable liquid

Bulk Package/Placard Marking:

For UN3160: Poison gas / 3160 and Flammable gas

For UN1965: Flammable gas / 1965

For UN1267: Flammable / 1267

Packaging - References:

For UN3160: None; 49 CFR 173.304; 173.314 & .315

For UN1965: 49 CFR: 173.306; 173.304; 173.314 & .315

For UN1267: 49 CFR 173.150; 173.201; 173.243 [**PG I**]

-or-

49 CFR 173.150; 173.202; 173.242 [**PG II**]

(Exceptions; Non-bulk; Bulk)

Hazardous Substance:

The EPA's Petroleum Exclusion applies to Section 2 and/or 15 components which are listed in 49 CFR 172.101, Table 1 to Appendix A.

Emergency Response Guide: Note:

UN3160 - 119; **UN1965** - 115; **UN1267** - 128;

Replace **X** in shipping description with:

D if Molar % H2S is from 8.8% to 14.8%

C if Molar % H2S is from 14.9% to 44.4%

B if Molar % H2S is from 44.5% to 100.0%

Container(s) greater than 5 liters (liquids) or 5 kilograms (solids), shipped by water mode and ALL bulk shipments may require the shipping description to contain the "Marine Pollutant" notation [49 CFR 172.203(I)] and the container(s) to display the [Marine Pollutant Mark] [49 CFR 172.322].

The following alternate shipping description order may be used until January 1, 2013:

Proper Shipping name, Hazard Class or Division, (Subsidiary Hazard if any), UN or NA number, Packing Group

Other shipping description elements may be required for DOT compliance.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

International Maritime Dangerous Goods (IMDG)

Shipping Description:	<p><i>If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is > 8.8 molar % shipping description is:</i> UN3160, Liquefied gas, toxic, flammable, n.o.s. (Hydrogen sulphide , Liquefied Petroleum Gas), 2.3.; , (2.1) <i>If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:</i> UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), 2.1; <i>If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:</i> UN1267, Petroleum crude oil, 3, I or II [I if IBP < 35° C (95° F); II if IBP > 35° C] (-46° C);</p>
Non-Bulk Package Marking:	<p><i>Must be consistent with shipping description, either:</i> Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), UN3160 <i>or</i> Hydrocarbon gas mixture, liquefied, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), UN1965 <i>or</i> Petroleum crude oil, UN1267</p>
Labels:	<p><i>For UN3160:</i> Toxic gas and Flammable gas <i>For UN1965:</i> Flammable gas <i>For UN1267:</i> Flammable liquid</p>
Placards/Marking (Bulk):	<p><i>For UN3160:</i> Toxic gas / 3160 and Flammable gas <i>For UN1965:</i> Flammable gas / 1965 <i>For UN1267:</i> Flammable / 1267</p>
Packaging - Non-Bulk:	<p><i>For UN3160 & UN1965:</i> P200 <i>For UN1267:</i> P001</p>
EMS:	<p><i>For UN3160 & UN1965:</i> F-D, S-U <i>For UN1267:</i> F-E, S-E</p>
Note:	<p><i>If container(s) is greater than 5 liters (liquids) or 5 kilograms (solids), shipment may require the shipping description to contain the "Marine Pollutant" description [IMDG 5.4.1.4.3.5] and the container(s) to display the Marine Pollutant mark [IMDG 5.2.1.6]. U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25. If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I.</i></p>
<u>International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)</u>	
UN/ID #:	UN3160 - <i>Forbidden</i> UN1965 <i>or</i> UN1267
Proper Shipping Name:	<p><i>For UN1965:</i> Hydrocarbon gas mixture, liquefied, n.o.s. (Liquefied petroleum gas, Hydrogen sulphide) <i>For UN1267:</i> Petroleum crude oil</p>
Hazard Class/Division:	<p><i>For UN1965:</i> 2.1 <i>For UN1267:</i> 3</p>
Subsidiary risk:	None
Packing Group:	<p><i>For UN1965:</i> None <i>For UN1267:</i> I or II [<i>Determined by IATA 3.3.2</i>]</p>
Non-Bulk Package Marking:	<p><i>For UN1965:</i> Hydrocarbon gas mixture, liquefied, n.o.s. (Liquefied petroleum gas, Hydrogen sulphide), UN1965 <i>For UN1267:</i> Petroleum crude oil, UN1267</p>
Labels:	<p><i>For UN1965:</i> Flammable gas , Cargo Aircraft Only <i>For UN1267:</i> Flammable liquid</p>
ERG Code:	<p><i>For UN1965:</i> 10L <i>or For UN1267:</i> 3L LTD. QTY Passenger Aircraft Cargo Aircraft Only</p>

Packaging Instruction #:	UN1965 - Forbidden UN1267 - Forbidden - [PG I] Y341 - [PG II]	UN1965 - Forbidden UN1267 - 351 - [PG I] 353 - [PG II]	UN1965 - 200 UN1267 - 361 - [PG I] 364 - [PG II]
Max. Net Qty. Per Package:	UN1267 - None (PG I); 1L (PG II)	UN1267 - 1L - [PG I] 5 L - [PG II]	UN1965 - 150 kg UN1267 - 30 L - [PG I] 60 L - [PG II]

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:

Component	TPQ	EPCRA RQ
Hydrogen Sulfide	500 lb	100 lb

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	Yes
Pressure Hazard:	No
Reactive Hazard:	No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration ¹	de minimis
Xylenes	1-8	1.0%
Toluene	1-7	1.0%
Cyclohexane	1-5	1.0%
Benzene	<5	0.1%
n-Hexane	2-4	1.0%
Ethyl Benzene	1-3	0.1%

EPA (CERCLA) Reportable Quantity (in pounds):

EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:

Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Type of Toxicity
Toluene	Developmental Toxicant Female Reproductive Toxicant
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant
Ethyl Benzene	Cancer

International Hazard Classification

Canada:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:

B2 - Flammable Liquids
D2A
D2B

National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: 1C981

Section 16: Other Information

Date of Issue:	1-Sep-2015
Status:	FINAL
Previous Issue Date:	1-Sep-2015
Revised Sections or Basis for Revision:	Identified Hazards (Section 2) Precautionary Statement(s) (Section 2) First Aid (Section 4) Exposure limits (Section 8) Shipping information (Section 14) Regulatory information (Section 15)
SDS Number:	730370

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and Implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.



Produced Brine Water

Safety Data Sheet

Section 1: Identification of the substance or mixture and of the supplier

Product Name: Produced Brine Water
SDS Number: 401320
Intended Use: Process Water
Manufacturer: Ascent Resources
3501 N.W. 63rd
Oklahoma City, OK 73116
Emergency Health and Safety Number: Chemtrec: 800-424-9300 (24 Hours)
SDS Information: Phone: 800-642-3074
URL: www.ascentresources.com

Section 2: Hazard(s) Identification

Classification

H302 – Harmful if swallowed – Category 1
H319 – Eye damage/irritation – Category 2
H316 – Causes mild skin irritation – Category 1
H332 – Harmful if inhaled – Category 1
H350 – Carcinogenicity – Category 1A
H412 – May cause chronic harmful effects to aquatic life – Category 2

Label Elements



DANGER

Causes serious eye irritation. (H319)*
Harmful if swallowed. (H302)*
Harmful if inhaled. (H332)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H412)*

Precautionary Statement(s):

Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Do not breathe dust/fume/gas/mist/vapours/spray. (P261)
Wash thoroughly after handling. (P264)*
Do not eat, drink, or smoke when using this product. (P270)*
Avoid release to the environment. (P273)*
Use outdoors in a well ventilated space (P271)
Wear protective gloves / protective clothing / eye protection. (P281)*
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338*)
If eye irritation persists: Get medical advice/attention. (P313)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P312)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P304 + P340)*
Get medical advice/attention if you feel unwell. (P314)*
Collect spillage. (P391)*
Store locked up. (P405)*
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)*
Dispose of contents/container to approved disposal facility. (P501)*

* (Applicable GHS hazard code.)

Section 3: Composition / Information on Ingredients

Component	CAS#	Concentration ¹
Water	7732-18-5	80-100%
Sodium chloride	91-20-3	<20%
Benzene	71-43-2	<2%

All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: For direct contact, remove contact lenses if present and easy to do. Immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 20 minutes. Seek immediate medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If breathing is difficult, oxygen or artificial respiration should be administered by qualified personnel. If symptoms persist, seek medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Section 5: Fire-Fighting Measures



NFPA 704 Hazard Class

Health: 1 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from flames and hot surfaces. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe vapors or mists. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H₂S, and flammability prior to entry. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	NIOSH
Water (7732-18-5)	Not established	Not established	Not established
Sodium chloride (7647-14-5)	Not established	Not established	Not established
Benzene (71-43-2)	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 1 ppm	STEL: 5 ppm TWA: 0.1 ppm

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection (such as splash goggles) that meets or exceeds ANSI Z87.1 is recommended when there is potential liquid contact to the eye. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with organic vapor cartridges/canisters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Varies (clear / amber / brown)
Physical Form:	Liquid
Odor:	Petroleum
Odor Threshold:	No data
pH:	4.9-8.5
Vapor Pressure:	No data available
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	212 °F / 100 °C
Melting/Freezing Point:	32 °F / 0 °C
Pour Point:	No data
Solubility in Water:	Infinintely
Partition Coefficient (n-octanol/water) (Kow):	>10
Specific Gravity (water=1):	1.0 -1.1 °API
Viscosity:	No data available
Evaporation Rate (nBuAc=1):	No data available
Flash Point:	No data available
Test Method:	Not applicable
Lower Explosive Limits (vol % in air):	1%
Upper Explosive Limits (vol % in air):	46%
Auto-ignition Temperature:	No data available

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid all possible sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing and reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

<u>Acute Toxicity</u>	<u>Hazard</u>	<u>Additional Information</u>	<u>LC50/LD50 Data</u>
Inhalation	Expected to have a low degree of toxicity by inhalation		No data
Skin Absorption	Unlikely to be harmful		No data
Ingestion (Swallowing)	Unlikely to be harmful		No data

Aspiration Hazard: Not expected to be an aspiration hazard.

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes serious eye irritation.

Signs and Symptoms: Effects of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue).

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure. Laboratory animal studies of hydrocarbon products by the dermal and inhalation exposure routes have demonstrated toxicity to the liver, blood, spleen and thymus

Carcinogenicity: May cause cancer, based on component information.

Germ Cell Mutagenicity: Inadequate information available.

Reproductive Toxicity: Inadequate information available.

Other Comments: This material may contain varying concentrations of polycyclic aromatic hydrocarbons (PAHs) which have been known to produce a phototoxic reaction when contaminated skin is exposed to sunlight. The effect is similar in appearance to an exaggerated sunburn, and is temporary in duration if exposure is discontinued. Continued exposure to sunlight can result in more serious skin problems including pigmentation (discoloration), skin eruptions (pimples), and possible skin cancers.

Information on Toxicological Effects of Components

Water

Carcinogenicity: No data available

Target Organs: No data available

Reproductive Toxicity: No data available

Germ Cell Mutagenicity: No data available

Sodium chloride

Carcinogenicity: No data available but sodium chloride has not been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Eyes, respiratory system, central nervous system

Reproductive Toxicity: No data available

Germ Cell Mutagenicity: No data available

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

Section 12: Ecological Information

Toxicity: Not evaluated

Persistence and Degradability: Not evaluated

Persistence per IOPC Fund definition: Not evaluated

Bioaccumulative Potential: Not evaluated although the solubility and log KOW would indicate it has little bioaccumulative potential.

Mobility in Soil: Not evaluated although the solubility properties indicate produced water would be highly mobile throughout a system.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping name: *Not regulated*

Note: Some states may require specific shipping labels. Contact each jurisdiction for more information.

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health: Yes
Chronic Health: Yes
Fire Hazard: No
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration ¹	de minimis
Benzene	<2	0.1%

EPA (CERCLA) Reportable Quantity (in pounds):

EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

Warning: This material may contain detectable quantities of the following chemicals identified on federal and individual state hazardous substances list. Contact each jurisdiction for more information.

Component	Type of Toxicity
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant

International Hazard Classification:

Canada:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:

D2A
D2B

National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: 1C981

Section 16: Other Information

Date of Issue:
Status:

1-Sep-2015
FINAL

Revised Sections or Basis for Revision:

Identified Hazards (Section 2)
Precautionary Statement(s) (Section 2)
First Aid (Section 4)
Shipping information (Section 14)
Regulatory information (Section 15)
401320

SDS Number:

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Attachment I: Emission Units Table

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices
that will be part of this permit application review, regardless of permitting status)

Emission Unit ID ¹	Emission Point ID ²	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type ³ and Date of Change	Control Device ⁴
FUG-1	14E	Sitewide Fugitive	2015	N/A	Mod	N/A
ENG-2	9E	Natural Gas-Fired Generator (HiPower)	2015	47 hp	Mod	N/A
GPU-1	1E	Gas Production Unit	2015	1.50 MMBtuH	Mod	N/A
GPU-2	2E	Gas Production Unit	2015	1.50 MMBtuH	Mod	N/A
GPU-3	3E	Gas Production Unit	2015	1.50 MMBtuH	Mod	N/A
HTR-1	4E	Line Heater	2015	1.50 MMBtuH	Mod	N/A
SEP-1	7E	Flash Separator Heater	2015	1.00 MMBtuH	Mod	N/A
CS-1	11E	Condensate Stabilizer Heater	2015	0.75 MMBtuH	Mod	N/A
CTK-1	15E	Tank 1 - Condensate Storage Tank	2015	400-bbl	Mod	CTRL-1
CTK-2	16E	Tank 2 - Condensate Storage Tank	2015	400-bbl	Mod	CTRL-1
CTK-3	17E	Tank 3 - Condensate Storage Tank	2015	400-bbl	Mod	CTRL-1
PTK-1	18E	Tank 4 - Prod. Water Storage Tank	2015	400-bbl	Mod	CTRL-1
PTK-2	19E	Tank 5 - Prod. Water Storage Tank	2015	400-bbl	Mod	CTRL-1
PTK-3	20E	Tank 6 - Prod. Water Storage Tank	2015	400-bbl	Mod	CTRL-1
CTRL-1	10E	Enclosed Combustor	2015	18.42 MMBtuH	Mod	N/A
TRL-1	12E	Condensate Truck Loading	2015	N/A	Mod	N/A
TRL-2	13E	Produced Water Truck Loading	2015	N/A	Mod	N/A
ROAD-1	21E	Unpaved Road Sources	2015	N/A	Mod	N/A

¹ For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S,... or other appropriate designation.

² For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

³ New, modification, removal

⁴ For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment J: Emission Points Data Summary Sheet

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ⁴)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
14E	Fugitive	14E	FUG-1	N/A	N/A	C	8760	VOC	2.13	9.27	2.13	9.27	Gas/Vapor	EE	
1E	Horizontal Stack	1E	GPU-1	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
2E	Horizontal Stack	2E	GPU-2	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
3E	Horizontal Stack	3E	GPU-3	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
4E	Horizontal Stack	4E	HTR-1	N/A	N/A	C	8760	VOC	0.01	0.04	0.01	0.04	Gas/Vapor	EE	
								NOx	0.15	0.64	0.15	0.64			
								CO	0.12	0.54	0.12	0.54			
								PM	0.01	0.05	0.01	0.05			
								SO2	<0.01	<0.01	<0.01	<0.01			
7E	Horizontal Stack	7E	SEP-1	N/A	N/A	C	8760	VOC	0.01	0.02	0.01	0.02	Gas/Vapor	EE	
								NOx	0.10	0.43	0.10	0.43			
								CO	0.08	0.36	0.08	0.36			
								PM	0.01	0.03	0.01	0.03			
								SO2	<0.01	<0.01	<0.01	<0.01			

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ⁴)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
9E	Vertical Stack	9E	ENG-2	N/A	N/A	C	8760	VOC	0.01	0.05	0.01	0.05	Gas/Vapor	EE	
								NOx	0.29	1.27	0.29	1.27			
								CO	0.50	2.18	0.50	2.18			
								PM	0.01	0.03	0.01	0.03			
								SO2	<0.01	<0.01	<0.01	<0.01			
11E	Horizontal Stack	11E	CS-1	N/A	N/A	C	8760	VOC	<0.01	0.02	<0.01	0.02	Gas/Vapor	EE	
								NOx	0.07	0.32	0.07	0.32			
								CO	0.06	0.27	0.06	0.27			
								PM	0.01	0.02	0.01	0.02			
								SO2	<0.01	<0.01	<0.01	<0.01			
15E	Vent / Combustor Vertical Stack	15E	CTK-1	10E	Flare	C	8760	VOC	--	91.03	--	1.82	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
16E	Vent / Combustor Vertical Stack	16E	CTK-2	10E	Flare	C	8760	VOC	--	91.03	--	1.82	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
17E	Vent / Combustor Vertical Stack	17E	CTK-3	10E	Flare	C	8760	VOC	--	91.03	--	1.82	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
18E	Vent / Combustor Vertical Stack	18E	PTK-1	10E	Flare	C	8760	VOC	--	0.20	--	<0.01	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	

Table 1: Emissions Data

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶	Emission Concentration ⁷ (ppmv or mg/m ³)
		ID No.	Source	ID No.	Device Type	Short Term ²	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
19E	Vent / Combustor Vertical Stack	19E	PTK-2	10E	Flare	C	8760	VOC	--	0.20	--	<0.01	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
20E	Vent / Combustor Vertical Stack	20E	PTK-3	10E	Flare	C	8760	VOC	--	0.20	--	<0.01	Gas/Vapor	O (Tanks 4.0.9d methodology, Promax)	
12E	Truck Vent	15E, 16E, 17E	CTK-1 CTK-2 CTK-3	N/A	N/A	C	8760	VOC	58.95	2.82	58.95	2.82	Gas/Vapor	EE	
13E	Truck Vent	18E, 19E, 20E	PTK-1 PTK-2 PTK-3	N/A	N/A	C	8760	VOC	0.59	0.14	0.59	0.14	Gas/Vapor	EE	
10E	Flare	10E	CTRL-1	N/A	N/A	C	8760	NOx VOC CO	1.25 1.22 6.82	5.49 5.36 29.85	1.25 1.22 6.82	5.49 5.36 29.85	Gas/Vapor	EE	
21E	Fugitive	21E	ROADS	N/A	N/A	C	8760	PM(total)	0.74	3.24	0.74	3.24	Solid	EE	

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

- 1 Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.
- 2 Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).
- 3 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. **DO NOT LIST** H₂, H₂O, N₂, O₂, and Noble Gases.
- 4 Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- 5 Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).
- 6 Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).
- 7 Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m³) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO₂, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data

Emission Point ID No. (Must match Emission Units Table)	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow ¹ (acfm) at operating conditions	Velocity (fps)	Ground Level (Height above mean sea level)	Stack Height ² (Release height of emissions above ground level)	Northing	Easting
9E	0.21	1050	208	100.1	1134	8	4384250	532770
1E	N/A	N/A	N/A	N/A	1134	10	4384255	532770
2E	N/A	N/A	N/A	N/A	1134	10	4384260	532770
3E	N/A	N/A	N/A	N/A	1134	10	4384265	532770
4E	N/A	N/A	N/A	N/A	1134	10	4384270	532770
5E	N/A	N/A	N/A	N/A	1134	10	4384275	532770
6E	N/A	N/A	N/A	N/A	1134	10	4384280	532770
7E	N/A	N/A	N/A	N/A	1134	10	4384285	532770
11E	N/A	N/A	N/A	N/A	1134	10	4384290	532770
15E	N/A	N/A	N/A	N/A	1134	20	4384295	532770
16E	N/A	N/A	N/A	N/A	1134	20	4384300	532770
17E	N/A	N/A	N/A	N/A	1134	20	4384305	532770
18E	N/A	N/A	N/A	N/A	1134	20	4384310	532770
19E	N/A	N/A	N/A	N/A	1134	20	4384315	532770
20E	N/A	N/A	N/A	N/A	1134	20	4384320	532770
10E	N/A	N/A	N/A	N/A	1134	20	4384325	532770
12E	N/A	N/A	N/A	N/A	1134	N/A	4384330	532770

13E	N/A	N/A	N/A	N/A	N/A	1134	N/A	4384335	532770
14E	N/A	N/A	N/A	N/A	N/A	1134	N/A	4384340	532770
21E	N/A	N/A	N/A	N/A	N/A	1134	N/A	4384345	532770

¹ Give at operating conditions. Include inerts.

² Release height of emissions above ground level.

Attachment K: Fugitive Emissions Data Summary Sheet

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS	
1.)	Will there be haul road activities? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.)	Will there be Storage Piles? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.)	Will there be Liquid Loading/Unloading Operations? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.)	Will there be emissions of air pollutants from Wastewater Treatment Evaporation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.)	Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.)	Will there be General Clean-up VOC Operations? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.)	Will there be any other activities that generate fugitive emissions? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."	

FUGITIVE EMISSIONS SUMMARY		All Regulated Pollutants - Chemical Name/CAS ¹	Maximum Potential Uncontrolled Emissions ²		Maximum Potential Controlled Emissions ³		Est. Method Used ⁴
			lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads		N/A					
Unpaved Haul Roads		N/A (Included in Attachment L)					
Storage Pile Emissions		N/A					
Loading/Unloading Operations		N/A (Included in Attachment L)					
Wastewater Treatment Evaporation & Operations		N/A					
Equipment Leaks		VOC HAPs	2.13 0.01	9.27 0.03	2.13 0.01	9.27 0.03	EE
General Clean-up VOC Emissions		N/A					
Other		N/A (Included in Attachment L)					

¹ List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. DO NOT LIST H₂, H₂O, N₂, O₂, and Noble Gases.

² Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

³ Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

⁴ Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

Attachment L: Emissions Unit Data Sheet(s)

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 1E, 2E, 3E

<p>1. Name or type and model of proposed affected source:</p> <p>Three (3) Gas Production Units</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>Per Unit: 0.01 lb/hr VOC 0.15 lb/hr NO_x 0.12 lb/hr CO 0.01 lb/hr PM</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>N/A</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable): (a) Type and amount in appropriate units of fuel(s) to be burned: Natural Gas: 1470.6 scf/hr		
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash: See Attachment N, Table 20.		
(c) Theoretical combustion air requirement (ACF/unit of fuel): <div style="display: flex; justify-content: space-between; align-items: center;"> @ °F and psia. </div>		
(d) Percent excess air:		
(e) Type and BTU/hr of burners and all other firing equipment planned to be used: 1.50 MMBtu/hr, each		
(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired: 		
(g) Proposed maximum design heat input: × 10⁶ BTU/hr.		
7. Projected operating schedule:		
Hours/Day	24	Days/Week
		7
		Weeks/Year
		52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:			
@	N/A	°F and	psia
a. NO _x	0.15	lb/hr	grains/ACF
b. SO ₂		lb/hr	grains/ACF
c. CO	0.12	lb/hr	grains/ACF
d. PM ₁₀	0.01	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	0.01	lb/hr	grains/ACF
g. Pb		lb/hr	grains/ACF
h. Specify other(s)			
Benzene	<0.0001	lb/hr	grains/ACF
Formaldehyde	<0.0001	lb/hr	grains/ACF
n-Hexane	0.003	lb/hr	grains/ACF
Toluene	<0.0001	lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

<p>9. Proposed Monitoring, Recordkeeping, Reporting, and Testing Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.</p>	
<p>MONITORING N/A</p>	<p>RECORDKEEPING N/A</p>
<p>REPORTING N/A</p>	<p>TESTING N/A</p>
<p>MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.</p> <p>RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.</p> <p>REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.</p> <p>TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.</p>	
<p>10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty N/A</p>	

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 4E, 5E, 6E

<p>1. Name or type and model of proposed affected source:</p> <p>One (1) Line Heater</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>0.01 lb/hr VOC 0.15 lb/hr NOx 0.12 lb/hr CO 0.01 lb/hr PM</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>N/A</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable): (a) Type and amount in appropriate units of fuel(s) to be burned: Natural Gas: 1470.6 scf/hr		
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash: See Attachment N, Table 20.		
(c) Theoretical combustion air requirement (ACF/unit of fuel): <div style="display: flex; justify-content: space-between; align-items: center;"> @ °F and psia. </div>		
(d) Percent excess air:		
(e) Type and BTU/hr of burners and all other firing equipment planned to be used: 1.50 MMBtu/hr		
(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired: 		
(g) Proposed maximum design heat input: × 10⁶ BTU/hr.		
7. Projected operating schedule:		
Hours/Day	24	Days/Week
		7
		Weeks/Year
		52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:			
@	N/A	°F and	psia
a. NO _x	0.15	lb/hr	grains/ACF
b. SO ₂		lb/hr	grains/ACF
c. CO	0.12	lb/hr	grains/ACF
d. PM ₁₀	0.01	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	0.01	lb/hr	grains/ACF
g. Pb		lb/hr	grains/ACF
h. Specify other(s)			
Benzene	<0.0001	lb/hr	grains/ACF
Formaldehyde	<0.0001	lb/hr	grains/ACF
n-Hexane	0.003	lb/hr	grains/ACF
Toluene	<0.0001	lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

N/A

RECORDKEEPING

N/A

REPORTING

N/A

TESTING

N/A

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

N/A

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 7E

<p>1. Name or type and model of proposed affected source:</p> <p>One (1) Flash Separator Heater</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>Per Unit: 0.01 lb/hr VOC 0.10 lb/hr NO_x 0.08 lb/hr CO 0.01 lb/hr PM</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>N/A</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable): (a) Type and amount in appropriate units of fuel(s) to be burned: Natural Gas: 735.3 scf/hr		
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash: See Attachment N, Table 20.		
(c) Theoretical combustion air requirement (ACF/unit of fuel): <div style="display: flex; justify-content: space-between; align-items: center;"> @ °F and psia. </div>		
(d) Percent excess air:		
(e) Type and BTU/hr of burners and all other firing equipment planned to be used: 1.0 MMBtu/hr, each		
(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired: 		
(g) Proposed maximum design heat input: × 10⁶ BTU/hr.		
7. Projected operating schedule:		
Hours/Day	24	Days/Week
		7
		Weeks/Year
		52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:			
@	N/A	°F and	psia
a. NO _x	0.10	lb/hr	grains/ACF
b. SO ₂		lb/hr	grains/ACF
c. CO	0.08	lb/hr	grains/ACF
d. PM ₁₀	0.01	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	0.01	lb/hr	grains/ACF
g. Pb		lb/hr	grains/ACF
h. Specify other(s)			
Benzene	<0.0001	lb/hr	grains/ACF
Formaldehyde	<0.0001	lb/hr	grains/ACF
n-Hexane	0.002	lb/hr	grains/ACF
Toluene	<0.0001	lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

N/A

RECORDKEEPING

N/A

REPORTING

N/A

TESTING

N/A

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

N/A

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 9E

<p>1. Name or type and model of proposed affected source:</p> <p>One (1) HiPower PSI/GM 3.0L natural gas-fired generator (47hp)</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>Per Unit: 0.01 lb/hr VOC 0.29 lb/hr NO_x 0.50 lb/hr CO 0.01 lb/hr PM</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>N/A</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable): (a) Type and amount in appropriate units of fuel(s) to be burned: Natural Gas: 8,681 Btu/hp-hr		
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash: See Attachment N, Table 20		
(c) Theoretical combustion air requirement (ACF/unit of fuel): <div style="display: flex; justify-content: space-between; align-items: center;"> @ °F and psia. </div>		
(d) Percent excess air:		
(e) Type and BTU/hr of burners and all other firing equipment planned to be used: 47 hp		
(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired: 		
(g) Proposed maximum design heat input: × 10⁶ BTU/hr.		
7. Projected operating schedule:		
Hours/Day	24	Days/Week
		7
		Weeks/Year
		52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	N/A	°F and	psia
a. NO _x	0.29	lb/hr	grains/ACF
b. SO ₂		lb/hr	grains/ACF
c. CO	0.50	lb/hr	grains/ACF
d. PM ₁₀	0.01	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	0.01	lb/hr	grains/ACF
g. Pb		lb/hr	grains/ACF
h. Specify other(s)			
Formaldehyde	0.01	lb/hr	grains/ACF
Acetaldehyde	0.003	lb/hr	grains/ACF
Acrolein	0.002	lb/hr	grains/ACF
Methanol	0.001	lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

<p>9. Proposed Monitoring, Recordkeeping, Reporting, and Testing Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.</p>	
<p>MONITORING N/A</p>	<p>RECORDKEEPING N/A</p>
<p>REPORTING N/A</p>	<p>TESTING N/A- Engine is certified. Certificate of Conformity is included in this application.</p>
<p>MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.</p> <p>RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.</p> <p>REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.</p> <p>TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.</p>	
<p>10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty N/A</p>	



HIPOWER®

RENTAL Gaseous Generator Set

Model: HRGM 30 T6

GM Vortec Series

Specification & Application Data



Photo may depict optional equipment.

Description

HIPOWER® rental generators are an efficient, reliable and versatile source of mobile electrical power. They are designed to operate in the most extreme working conditions. All HIPOWER® Gaseous Rental Generators have a unique combination of innovative design and the use of high quality materials that provide the user with the most dependable power that you can rely on for non-stop power with easy to operate controls.

The generator set is powered by a radiator-cooled, industrial GM Vortec gaseous engine, which meets current Environmental Protection Agency (EPA) non-road exhaust emission regulations, driving a single bearing, four-pole, three-phase alternator, with IP23 protection. The Prime Power kVA rating for generator set is given with a 125 degree C alternator winding temperature rise.

HIPOWER® Features and Benefits

GM Vortec Engine: Long-life, heavy-duty, 4-cycle, gaseous engine from a world renown manufacturer for economy of operation and maximum reliability and durability. Capable of full rated load acceptance in one step.

Cooling: Radiator with belt driven pusher fan.

Filtration: Heavy-duty replaceable element air-cleaner.

Alternator: Single bearing, rotating field, self-excited, self-ventilated, 12-wire re-connectable, 60Hz brushless alternator with permanent magnetic generator (PMG) for reduced service and maintenance requirements, with Class H insulation. Automatic voltage regulator (AVR) providing close voltage regulation. Has a high skVA starting capability for electric motor loads.

Arrangement: Engine and alternator units are closed coupled together and with mobile style anti-vibration isolators, mounted between the assembly and a heavy-duty steel base. The sturdy base frame has openings allowing for winching, slinging and forklift pockets for ease of handling

60Hz Prime Power Ratings kW & kVA

Voltage VAC	Phase	PF	LPG		NG	
			kW	kVA	kW	kVA
120/240	1	0.8	15.6	19.5	14.3	17.9
120/208	3	0.8	24.0	30.0	22.0	27.5
120/240 Delta	3	0.8	N.A	N.A	N.A	N.A
277/480	3	0.8	24.0	30.0	22.0	27.5
347/600	3	0.8	24.0	30.0	22.0	27.5

Rating Definitions: (N.A. = Not available for model designated)

Prime - All Rental Sets are Prime Rated - Prime rating is applicable for supplying power to a varying load in lieu of utility for an unlimited amount of running of amount of running time. (Max. load factor = 80%) A 10% overload capacity is available for 1 out of every 12 hours.

HIPOWER® Features and Benefits

Enclosure: Fully sound attenuated enclosure, fabricated in 11-gauge steel, powder coated with finish that exceeds 1000-hr salt spray test, curved edges, minimum outside fasteners.

Ample layer of durable sound insulating material placed all around the inside of the container, doors and ducting with metal retainer frames. Can be cleaned by high-pressure water and is oil and fire resistant.

Vertical air discharge for quiet operation.

Wide steel lockable access doors with rubber seals, for easy entrance of all maintenance personnel and any necessary service by technicians, with stainless steel hinges, hardware and fasteners resistant to corrosion.

Exhaust: Effective low noise, steel residential-type exhaust silencer and catalytic converter with rain cap

Controls: Digital control panel to operate all manual and automatic start and stop features. Many programmable automatic functions for local and remote controls with LED lights, tamper proof engine hour recorder with analog meters: voltmeter & switch, three (3) ammeters, Hz meter, fuel gauge and battery charger.

HIPOWER® Rental Options

Voltage Selector Switch: Three-position, manual voltage selector switch. Lockable in three positions for switching set between 120/240V single phase and 120/208 and 277/480V 3-phase. - NOT AVAILABLE AT 600V CONNECTION.

Power Distribution: Consult HIPOWER® regarding the comprehensive range of power distribution accessories available.

Oil field heavy duty rental skid: Heavy duty sub base

(See page 3 for additional options)



Gaseous Generator Set Specification:

LPG/NG Rental Generator Set Model: HRGM 30 T6 PSI - GM Vortec

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	plus or minus 1%
Frequency regulation	Isynchronous
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications
skVA at 480 volts with 30% voltage dip	76
Main Line Circuit breaker – amps capacity	105

ENGINE

Manufacturer	PSI-General Motors
Model	Vortec 3.0L
EPA certified	Yes
Crankshaft speed	1,800rpm
Type	LPG/NG fueled, 4-stroke
Ignition	Spark Plug
Aspiration	Natural
Number of Cylinders	4
Cylinder arrangement	In-line
Displacement CID (liters)	181 (3.0)
Bore and Stroke ins (mm)	4 x 3.6 (10.2 x 9.1)
Nominal power	LPG 48 hp NG 47 hp
Cooling	Liquid
Governor	Electronic
Starting motor & alternator	12 volt
Compression ratio	9.3 : 1
Air cleaner type	Dry, replaceable cartridge
Exhaust gas flow at full output lb/hr (kg/hr)	250 (7.1)
Exhaust temperature at full load - dry exhaust °F (°C)	1056 (569)
Maximum permitted back pressure - in. HG (kPa)	3.0 (10.2)

Cooling System:

Radiator- cooled cooling air flow - cu. ft./min. (cu. m/min.)	2500 (72)
Alternator cooling flow - cu. ft./min. (cu. m/min.)	250 (4.5)
Combustion air - cu. ft./min. (cu. m/min.)	64 (1.8)
Total cooling air flow (engine + alternator + combustion)	2814 (78.3)
Radiator system capacity, including engine - gallons (L)	5.0 (18.9)

Lubrication system:

Oil pan capacity - quarts (L)	4.0 (3.8)
Oil pan capacity with filter - quarts (L)	4.3 (4.1)
Oil filter - quantity and type	1, Replaceable Spin-On
Recommended lubricating oil grade - above 0 ° F (below 0 ° F)	
Oil consumption at full load	Less than 0.1% of fuel consumption
Oil pressure – psi (bars)	46.0 (320.0)

Engine Electrical System:

Starting motor voltage	12 volt
Battery - AH	1, size BC I# 24F
Maximum battery charge alternator output - amps	70
Cold Cranking Amps - minimum	600

HIPOWER Sound Attenuated Enclosure:**Model - AT1**

Noise level - dBA at 23 feet (7 meters)	74
Dimensions - inches	82 x 36 x 47
Dry weight - lbs.	1,617

Fuel System: (*Measured at gen-set fuel inlet, downstream of any dry fuel or filter accessories.)

Fuel type	LPG or Natural Gas, vapor withdrawl
Fuel supply line - inlet	1" NPTF
*Natural gas and LPG fuel supply pressure - in. column H ₂ O (kPa)	7" - 11" (1.74 - 2.74)

Prime Rating Fuel consumption:

LPG - cu. ft./hour (kg/hour) at 100% standby rating	168 (4.8)
Natural Gas - cu. ft./hour (kg/hour) at 100% standby rating	400 (11.3)

Alternator Specification:

Manufacturer	Stamford
Alternator model, winding & AVR model	127/208; 277/480 volts 600 volts
	PI 144 H PI 144 H
Voltages	3-phase 120/208, 277/480, 347/600
Alternator Type	4-pole, rotating field
Excitation System	Brushless with EBS/AS480 AVR
Power factor	0.8
Number of leads	12
Stator Pitch	2/3
Insulation	Class H
Windings - Temperature Rise	120° C
Enclosure (IEC-34-S)	IP 23
Bearing	Single, sealed
Coupling	Flexible disc
Amortisseur windings	Full
Voltage regulation - no load to full load with MX341 AVR	plus or minus 1%
TIF	< 50
Line harmonics	5% maximum

Standard Accessories: (see back-page for control panel details)

• Radiator with pusher fan	• All rotating components (i.e. fan) protected with metal guards
• Dry air cleaner	• All hot components (i.e. exhaust) protected with metal guards
• Heavy-duty engine start batteries in rack with cables	• Ground connection prepared for ground spike (not supplied)
• Emergency stop switch	• Main line ABB UL listed circuit breaker for overload protection
• Control Panel DSE7310 (See over for details)	• Operation and installation literature
• Two dry contacts for auto-start	• CSA certified
• Steel base for mounting on firm surface such as concrete	• Control panel DSE 7310 MANUAL & AUTO START MODULE

Optional Accessories:

<input type="checkbox"/> Rotary voltage selector switch (not available with 600V connection)	<input type="checkbox"/> Interior lights
<input type="checkbox"/> Alternator anti-condensation heaters	<input type="checkbox"/> Shore power receptacle
<input type="checkbox"/> Winterization kit for low ambient temperature	<input type="checkbox"/> Engine Block heater
<input type="checkbox"/> Electric actuator and louvers for air intake and exhaust	<input type="checkbox"/> Control panel heater
<input type="checkbox"/> Snow hoods for air intake and exhaust	<input type="checkbox"/> Oil fiels heavy duty rental skid
<input type="checkbox"/> DOT certified towing trailer	<input type="checkbox"/> Oil Make-up system

• **Distribution power panel** *See image RH back-page

Aluminum 0.090" enclosure black powder coated - covered panel NEMA 3R/IP67rated weather proof assembly - Individual Square-D QOQ branch breakers - 2 x 20A 125V NEMA 5-20 GFCI duplex receptacles - 3 x 50A 125/250V CS6369 Twist-lock receptacles & Lexan covers - 50A California Style twist lock (1Φ only) - 1 set Camlock devices rated 400A - Color coded Camlock devices 3Φ - 5W black, red, blue, white & green - Pad lockable 1/4 turn door access with cable trap - Auxiliary bus bars with mechanical lugs - Mechanical lugs up to 250MCM cable

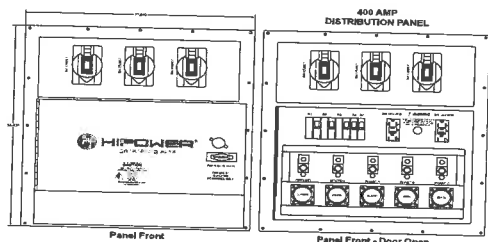
HIPOWER® DSE 7310 Control Panel: The DSE model 7310 digital control panel is back-lit with icon LCD text display, and is PC configurable. It works with the engine electronic governor with PLC functionality, protected front panel editing, and includes: manual, automatic and remote (input) start, PC configurable six inputs and four outputs, configurable timers and alarms, generator voltage and Hz display, battery voltage display, engine speed display, multiple engine parameters are monitored simultaneously, comprehensive shutdown or warning on fault condition, engine preheat, LED and LCD alarm indication, tamper-proof hour counter provides accurate information for monitoring and maintenance periods. The module monitors: engine speed, frequency, voltage and engine run hours and also displays the warning and shutdown status



Engine alarms included: High coolant temperature, low oil pressure, low coolant level, unexpected shutdown, low fuel level, stop failure, low battery voltage, battery charging alternator failure, over-speed, under-speed, start failure and emergency stop.

Alternator alarms included: Overload, unbalanced voltage, over voltage, under voltage, over frequency, under frequency, short circuit, reverse power, and incorrect phase sequence.

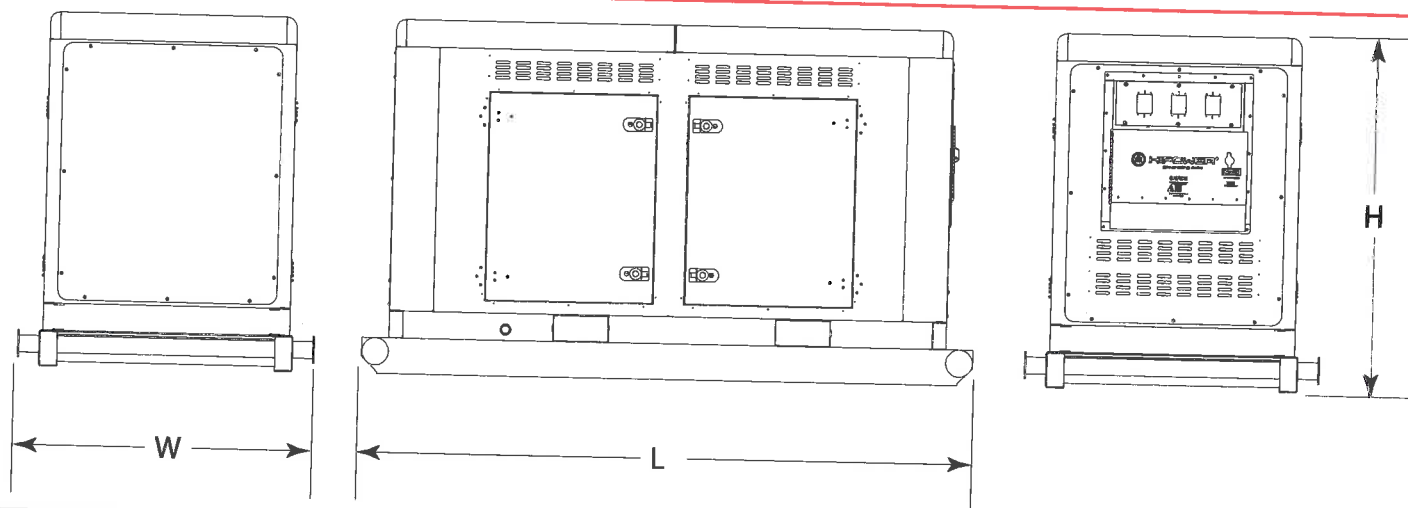
Instrumentation and gauges included: 3 ammeters, frequency meter, voltmeter plus selector, hour meter, fuel gauge, battery charger gauge, oil pressure gauge, water temperature gauge, siren and emergency stop button.



Pictures of Control Panel RH and Distribution Panel LH may include optional equipment and/or accessories

Model HRGM 30 T6

key dimensions and sound levels



Generator Data (L, W & H dimensions in inches)					
Configuration	L = Length	W = Width	H = Height	Net Weight lbs	dBA
Enclosed	82"	36"	47"	1525	73
Enclosed (with oil field heavy duty rental skid)	90"	43.5"	52.5"	1917	73

* All measurements are approximate and for estimation purposes only. Sound levels measured at 23ft (7m) and does not account for ambient site conditions.

Codes and Standards Compliances used where applicable



NFPA 99
NFPA 110
ISO 8528-5
ISO 1708A.5
ISO 3046

BS5514
SAE J1349
DIN6271
IEE C62.41 TESTING
NEMA ICS 1

your partner for power™

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2015 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: Power Solutions International, Inc.
(U.S. Manufacturer or Importer)

Certificate Number: FPSIB2.97GLP-001

Effective Date:

10/06/2014

Expiration Date:

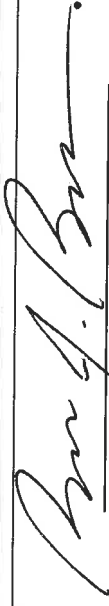
12/31/2015

Issue Date:

10/06/2014

Revision Date:

N/A


Byron J. Bunker, Division Director
Compliance Division

Manufacturer: Power Solutions International, Inc.

Engine Family: FPSIB2.97GLP

Certification Type: Mobile and Stationary

Fuel : Gasoline (up to and including 10% Ethanol)

Natural Gas (CNG/LNG)

LPG/Propane

Emission Standards : HC + NOx (g/kW-hr) : 2.7

CO (g/kW-hr) : 4.4

NMHC + NOx (g/kW-hr) : 2.7CO (g/kW-hr) : 4.4

HC + NOx (g/kW-hr) : 2.7

NMHC + NOx (g/kW-hr) : 2.7

Emergency Use Only : N

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 1048, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 1048 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 1048 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 1048. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 1048. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 1048.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): 11E

<p>1. Name or type and model of proposed affected source:</p> <p>One (1) Condensate Stabilizer Heater</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>N/A</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>Per Unit: 0.004 lb/hr VOC 0.07 lb/hr NOx 0.06 lb/hr CO 0.01 lb/hr PM</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>N/A</p>

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable): (a) Type and amount in appropriate units of fuel(s) to be burned: Natural Gas: 735.3 scf/hr			
(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash: See Attachment N, Table 20.			
(c) Theoretical combustion air requirement (ACF/unit of fuel): <div style="display: flex; justify-content: space-between; align-items: center;"> @ °F and psia. </div>			
(d) Percent excess air:			
(e) Type and BTU/hr of burners and all other firing equipment planned to be used: 0.75 MMBtu/hr			
(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired: 			
(g) Proposed maximum design heat input: × 10⁶ BTU/hr.			
7. Projected operating schedule:			
Hours/Day	24	Days/Week	7
		Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	N/A	°F and	psia
a. NO _x	0.07	lb/hr	grains/ACF
b. SO ₂		lb/hr	grains/ACF
c. CO	0.06	lb/hr	grains/ACF
d. PM ₁₀	0.01	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	0.004	lb/hr	grains/ACF
g. Pb		lb/hr	grains/ACF
h. Specify other(s)			
Benzene	<0.0001	lb/hr	grains/ACF
Formaldehyde	<0.0001	lb/hr	grains/ACF
n-Hexane	0.001	lb/hr	grains/ACF
Toluene	<0.0001	lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

N/A

RECORDKEEPING

N/A

REPORTING

N/A

TESTING

N/A

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

N/A

Attachment L
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS

Furnish the following information for each new or modified bulk liquid transfer area or loading rack, as shown on the *Equipment List Form* and other parts of this application. This form is to be used for bulk liquid transfer operations such as to and from drums, marine vessels, rail tank cars, and tank trucks.

Identification Number (as assigned on <i>Equipment List Form</i>):				
1. Loading Area Name: 12E, 13E				
2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):				
<input type="checkbox"/> Drums <input type="checkbox"/> Marine Vessels <input type="checkbox"/> Rail Tank Cars <input checked="" type="checkbox"/> Tank Trucks				
3. Loading Rack or Transfer Point Data:				
Number of pumps		2		
Number of liquids loaded		2 - Condensate, Produced Water		
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time		1		
4. Does ballasting of marine vessels occur at this loading area?				
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Does not apply				
5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point:				
N/A				
6. Are cargo vessels pressure tested for leaks at this or any other location?				
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
If YES, describe:				
7. Projected Maximum Operating Schedule (for rack or transfer point as a whole):				
Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	1	1	1	1
days/week	7	7	7	7

weeks/quarter	13	13	13	13
---------------	----	----	----	----

8. Bulk Liquid Data (add pages as necessary):

Pump ID No.	1	2				
Liquid Name	Condensate	Produced Water				
Max. daily throughput (1000 gal/day)	8,000 gal/hr	8,000 gal/hr				
Max. annual throughput (1000 gal/yr)	766.5	3,832.5				
Loading Method ¹	SUB	SUB				
Max. Fill Rate (gal/min)	133.3	133.3				
Average Fill Time (min/loading)	60	60				
Max. Bulk Liquid Temperature (°F)	55	55				
True Vapor Pressure ²	8.46	8.46				
Cargo Vessel Condition ³	U	U				
Control Equipment or Method ⁴	N/A	N/A				
Minimum control efficiency (%)						
Maximum Emission Rate	Loading (lb/hr)	58.95	0.59			
	Annual (lb/yr)	5,647.99	282.40			
Estimation Method ⁵	EPA	EPA				
¹ BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill						
² At maximum bulk liquid temperature						
³ B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)						
⁴ List as many as apply (complete and submit appropriate <i>Air Pollution Control Device Sheets</i>): CA = Carbon Adsorption LOA = Lean Oil Adsorption CO = Condensation SC = Scrubber (Absorption) CRA = Compressor-Refrigeration-Absorption TO = Thermal Oxidation or Incineration CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system) O = other (describe)						
⁵ EPA = EPA Emission Factor as stated in AP-42 MB = Material Balance						

TM = Test Measurement based upon test data submittal
O = other (describe)

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

Ascent will monitoring loading volume to ensure emissions do not exceed those listed in this application.

RECORDKEEPING

Ascent will keep records of loading volumes to ensure emissions do not exceed those listed in this application.

REPORTING

Ascent will submit reports as required.

TESTING

N/A

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

N/A

Attachment L
EMISSIONS UNIT DATA SHEET
CHEMICAL PROCESS

For chemical processes please fill out this sheet and all supplementary forms (see below) that apply. Please check all supplementary forms that have been completed.

- ☐ *Emergency Vent Summary Sheet*
☒ *Leak Sources Data Sheet*
☐ *Toxicology Data Sheet*
☐ *Reactor Data Sheet*
☐ *Distillation Column Data Sheet*

1. Chemical process area name and equipment ID number (as shown in *Equipment List Form*)
 Sitewide Fugitives (14E)

2. Standard Industrial Classification Codes (SICs) for process(es)
 1311

3. List raw materials and ☐ attach MSDSs
 N/A- fugitive gas emissions only

4. List Products and Maximum Production and ☐ attach MSDSs

Description and CAS Number	Maximum Hourly (lb/hr)	Maximum Annual (ton/year)

5. Complete the *Emergency Vent Summary Sheet* for all emergency relief devices.

6. Complete the *Leak Source Data Sheet* and describe below or attach to application the leak detection or maintenance program to minimize fugitive emissions. Include detection instruments, calibration gases or methods, planned inspection frequency, and record-keeping, and similar pertinent information. If subject to a rule requirement (e.g. 40CFR60, Subpart VV), please list those here.

Ascent staff will perform AVO walkthroughs during site visits, expected to be at least weekly.

7. Clearly describe below or attach to application Accident Procedures to be followed in the event of an accidental spill or release.

Ascent will repair and report any accidental release as soon as possible following the incident.

8A. Complete the <i>Toxicology Data Sheet</i> or attach to application a toxicology report (an up-to-date material safety data sheets (MSDS) may be used) outlining the currently known acute and chronic health effects of each compound or chemical entity emitted to the air. If these compounds have already been listed in Item 3, then a duplicate MSDS sheet is not required. Include data such as the OSHA time weighted average (TWA) or mutagenicity, teratogenicity, irritation, and other known or suspected effects should be addressed. Indicate where these are unknown, and provide references.			
8B. Describe any health effects testing or epidemiological studies on these compounds that are being or may be conducted by the company or required under TSCA, RCRA or other federal regulations. Discuss the persistence in the environment of any emission (e.g. pesticides, etc.).			
9. Waste Products - Waste products status: (If source is subject to RCRA or 45CSR25, please contact the Hazardous Waste Section of WVDEP, OAQ at (304) 926-3647.)			
9A. Types and amounts of wastes to be disposed:			
9B. Method of disposal and location of waste disposal facilities: N/A Carrier: _____ Phone: _____			
9C. Check here if approved USEPA/State Hazardous Waste Landfill will be used <input type="checkbox"/>			
10. Maximum and Projected Typical Operating Schedule for process or project as a whole (circle appropriate units).			
circle units:	(hrs/day) (hr/batch)	(days), (batches/day), (batches/week)	(days/yr), (weeks/year)
10A. Maximum	24 hrs/day	7 days/week	52 weeks/year
10B. Typical	24 hrs/day	7 days/week	52 weeks/year
11. Complete a <i>Reactor Data Sheet</i> for each reactor in this chemical process.			
12. Complete a <i>Distillation Column Data Sheet</i> for each distillation column in this chemical process.			
13. Proposed Monitoring, Recordkeeping, Reporting, and Testing Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.			
MONITORING Ascent staff will perform AVO walkthroughs during site visits, expected to be at least weekly.		RECORDKEEPING Ascent staff will note any detected leaks and the repairs done to repair them.	
REPORTING In the case of a reportable event, Ascent will contact the WV DEP and comply with any applicable requirements.		TESTING N/A	
MONITORING. Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment operation or air pollution control device.			
RECORDKEEPING. Please describe the proposed recordkeeping that will accompany the monitoring.			
REPORTING. Please describe the proposed frequency of reporting of the recordkeeping.			
TESTING. Please describe any proposed emissions testing for this process equipment or air pollution control device.			
14. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty N/A			

INFORMATION REQUIRED FOR CHEMICAL PROCESSES

The notes listed below for chemical processes are intended to help the applicant submit a complete application to the OAQ; these notes are not intended to be all inclusive. The requirements for a complete application for a permit issued under 45CSR13 are designed to provide enough information for a permit reviewer to begin a technical review. Additional information beyond that identified may be required to complete the technical review of any individual application.

Process Description

Please keep these points in mind when completing your process description as part of this permit application.

1. Provide a general process overview. This brief, but complete, process description should include chemical or registered trademark names of chemical products, intermediates, and/or raw materials to be produced or consumed, and the ultimate use(s) of the product(s). A list of the various chemical compounds is helpful.
2. Describe each process step. Include the process chemistry and stoichiometrically balanced reaction equation or material mass balance on all components.
3. Describe the methods and equipment used to receive, store, handle, and charge raw materials.
4. Describe the methods and equipment used to handle, store, or package final products and intermediates.
5. Provide process flow diagrams or equipment layout drawings which clearly show the process flow relationships among all pieces of process and control equipment. Identify all air emission discharge points. Discuss instrumentation and controls for the process.
6. Discuss the possibilities of process upsets, the duration and frequency of upsets, and consequences (including air emissions) of these upsets. Include a description of rupture discs, pressure relief valves, and secondary containment systems.
7. Discuss any fugitive emissions and the methods used to minimize them.
8. Include the following plans for the process if available:
 - a. preventative maintenance and malfunction abatement plan (recommended for all control equipment).
 - b. continuous emissions (in-stack) monitoring plan
 - c. ambient monitoring plan
 - d. emergency response plan

Regulatory Discussion

The following state and federal air pollution control regulations may be applicable to your chemical process. You should review these regulations carefully to determine if they apply to your process. Please summarize the results of your review in your permit application along with any other regulations you believe are applicable.

- Title 45 Legislative Rule Division of Environmental Protection, Office of Air Quality contains West Virginia's air pollution control regulations, including the following promulgated rules which may require emissions reductions or control technologies for your chemical process:
 - a. 45CSR27 - Best Available Technology (BAT) for Toxic Air Pollutants (TAPs)
 - b. 45CSR21 - VOC emissions controls for ozone maintenance in Kanawha, Cabell, Putnam, Wayne, and Wood counties.
 - c. 45CSR13 (Table 45-13A) - plantwide emission thresholds for permitting for certain pollutants.
- Federal Guidelines for case-by-case MACT determinations under section 112(g) of the 1990 CAAA for individual and total HAPs greater than 10 and 25 tons per year, respectively.
- There are also subparts of the federal Standards of Performance for New Stationary Sources (NSPS), 40CFR60 60, and the National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40CFR61 and 40CFR63, which apply to various chemical and nonchemical processes. These subparts are too numerous to list here, but these areas of the federal regulations should be consulted carefully to determine applicability to your process.

Emissions Summary and Calculations

Please keep these points in mind when submitting your emissions calculations as part of this permit application.

1. For each pollutant, provide the basis for the emissions estimate and for all emission reduction(s) or control efficiency(ies) claimed.
2. For all batch processes provide the following
 - a. Emissions of each pollutant in pound(s) per batch, from each process step
 - b. Annual emissions based on number of batches requested per year
 - c. The total time for each process step and the duration of the emissions during the process step
 - d. Total batch time, total emissions per batch (or per day), and annual emissions based on the number of batches requested per year.

EMERGENCY VENT SUMMARY SHEET

List below all emergency relief devices, rupture disks, safety relief valves, and similar openings that will vent only under abnormal conditions.

[illegible]

All routine vents (non-emergency) should be listed on the *Emission Points Data Summary Sheet*.

¹ Indicate the emission point, if any, to which source equipment normally vents. Do not assign emission point ID numbers to each emergency relief vent or device.

² List all emergency relief devices next to the piece of equipment from which they control releases.

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components ¹	Number of Components Monitored by Frequency ²	Average Time to Repair (days) ³	Estimated Annual Emission Rate (lb/yr) ⁴
Pumps ⁵	light liquid VOC ^{6,7}				
	heavy liquid VOC ⁸				
	Non-VOC ⁹				
Valves ¹⁰	Gas VOC	200	0	7	2,784
	Light Liquid VOC	200	0	7	9,636
	Heavy Liquid VOC				
	Non-VOC				
Safety Relief Valves ¹¹	Gas VOC	35	0	7	2,713
	Non VOC				
Open-ended Lines ¹²	VOC				
	Non-VOC				
Sampling Connections ¹³	VOC	1,300	0	7	2,522
	Non-VOC				
Compressors	VOC				
	Non-VOC				
	VOC				
Flanges	VOC	725	0	7	898
	Non-VOC				
Other	VOC				
	Non-VOC				

^{1 - 13} See notes on the following page.

Notes for Leak Source Data Sheet

1. For VOC sources include components on streams and equipment that contain greater than 10% w/w VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.
2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in ppm. Do not include monitoring by visual or soap-bubble leak detection methods. "M/Q(M)/Q/SA/A/O" means the time period between inspections as follows:

Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/Other (specify time period)

If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with none checked at any other frequency, you would put in the category "valves, gas service:" 0/50/0/75/0/50 (bimonthly).
3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.
4. Note the method used: MB - material balance; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); O - other method, such as in-house emission factor (specify).
5. Do not include in the equipment count sealless pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)
6. Volatile organic compounds (VOC) means the term as defined in 40 CFR §1.100 (s).
7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a light liquid.
8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a heavy liquid.
9. LIST CO, H₂S, mineral acids, NO, NO₂, SO₃, etc. DO NOT LIST CO₂, H₂, H₂O, N₂, O₂, and Noble Gases.
10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.
11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.
12. Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.
13. Do not include closed-purge sampling connections.

[illegible]

2 Time Weighted Average, Ceiling Limit, or other, with units.

⁴Relying on animal or human studies, indicate if any data suggests: C = carcinogenicity, M = mutagenicity, T = teratogenicity, O = oncogenicity

5 Indicate if there are dermal or eye irritation effects and whether they are considered to be low, moderate, or severe.

REACTOR DATA SHEET

Provide the following information for each piece of equipment that is a potential or actual source of emissions as shown on the *Equipment List Form* and other parts of application.

Identification Number (as shown on <i>Equipment List Form</i>):							
1. Name and type of equipment (e.g. CSTR, plug flow, batch, etc.)							
2. Type of operation <input type="checkbox"/> Batch <input type="checkbox"/> Continuous <input type="checkbox"/> Semi-batch							
3. Projected Actual Equipment Operating Schedule (complete appropriate lines):							
hrs/day		days/week		weeks/year			
hrs/batch		batches/day, weeks (Circle one)		day, weeks/yr (Circle one)			
4. Feed Data Flow In = gal/hr, or gal/batch							
Material Name & CAS No.	Phase ^a	Specific Gravity	Vapor Pressure ^b	Charge Rate			Fill Time (min/batch, run) ^c
Normal	Max	Units					
<p>a. S = Solid, L = Liquid, G = gas or vapor</p> <p>b. At feed conditions</p> <p>c. Total time that equipment is filling per batch or run (start-up), for tank or vessel-type equipment.</p>							
5. Provide all chemical reactions that will be involved (if applicable), including the residence time and any side reactions that may occur as well as gases that may be generated during these reactions. Indicate if the reaction(s) are exothermic or endothermic.							

6. Maximum Temperature <div style="text-align: center;">°C</div> <div style="text-align: center;">°F</div>				7A. Maximum Pressure 7B. Max. Set Pressure for venting <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">mmHg psig</div> <div style="text-align: center;">mmHg psig</div> </div>		
---	--	--	--	---	--	--

8. Output Data Flow Out = gal/hr or gal/batch						
Material Name and CAS No.	Phase	Specific Gravity	Vapor Pressure	Hourly or Batch Output Rate		Units
Normal	Maximum					

9. Complete the following emission data for equipment connected to a header exhaust system, giving emissions levels before entering header system (i.e. before control equipment).
☐ Check here if not applicable
 Emission Point ID (exhaust point of header system):

Material Name and CAS No.	Maximum Potential Emission Rate (lb/hr)	Method **

** MB - material balance: EE - Engineering Estimate: TM - Test Measurement (submit test data): O - other (Explain)

10. Provide the following information pertaining to each condenser that may be attached to this reactor. Attach additional pages as necessary if more than one condenser is used for this reactor. Complete the Condenser Air Pollution Control Device Sheet if necessary.

☐ Check here if not applicable

- 10A. Cooling material
- 10B. Minimum and Maximum flowrate of cooling material (gal/hr)
- 10C. Inlet temperature of cooling material (°F)
- 10D. Outlet temperature of cooling material (°F)
- 10E. Pressure drop of gas to be condensed from inlet to outlet (psig)
- 10F. Inlet temperature of gas stream (°F)
- 10G. Outlet temperature of gas stream (°F)
- 10H. Number of passes
- 10I. Cooling surface area

11. Provide the following pertaining to auxiliary equipment that burns fuel (heaters, dryers, etc.):

☐ Check here if not applicable

11A. Type of fuel and maximum fuel burn rate, per hour:

11B. Provide maximum percent sulfur (S), ash content of fuel, and the energy content using appropriate units:

%S

% Ash

BTU/lb, std. ft³/day, gal

(circle one)

11C. Theoretical combustion air requirement in SCFD per unit of fuel (circle appropriate unit) @ 70°F and 14.7 PSIA:

SCFD/lb, SCFD, gal (circle one)

11D. Percent excess air: %

11E. Type, amount, and BTU rating of burners and all other firing equipment that are planned to be used:

11F. Total maximum design heat input: ×10⁶ BTU/hr.

12. Proposed Monitoring, Recordkeeping, Reporting, and Testing

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

RECORDKEEPING

REPORTING

TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION OR AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT OR AIR POLLUTION CONTROL DEVICE.

13. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NOTE: An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this reactor.

DISTILLATION COLUMN DATA SHEET

Identification Number (as assigned on <i>Equipment List Form</i>):			
1. Name and type of equipment			
#. Projected actual equipment operating schedule (complete appropriate lines):			
hrs/day	days/week	weeks/year	
hrs/batch	batches/day, batches/week (circle one)	days/yr, weeks/yr (circle one)	
2. Number of stages (plates), excluding condenser			
3. Number of feed plates and stage location			
4. Specify details of any reheating, recycling, or stage conditioning along with the stage locations			
5. Specify reflux ratio, R (where R is defined as the ratio of the reflux to the overhead product, given symbolically as $R=L/D$, where L = liquid down column, D = distillation product)			
6. Specify the fraction of feed which is vaporized, f (where f is the molal fraction of the feed that leaves the feed plate continuously as vapor).			
7A. Type of condenser used: <input type="checkbox"/> total <input type="checkbox"/> partial <input type="checkbox"/> multiple <input type="checkbox"/> other			
7B. For each condenser provide process operating details including all inlet and outlet temperatures, pressures, and compositions.			
8. Feed Characteristics			
A. Molar composition			
B. Individual vapor pressure of each component			
C. Total feed stage pressure			
D. Total feed stage temperature			
E. Total mass flow rate of each stream into the system			
9. Overhead Product			
A. Molar composition of components			
B. Vapor pressure of components			
C. Total mass flow rate of all streams leaving the system as overhead products			
10. Bottom Product			
A. Molar composition of all components			
B. Total mass flow rate of all streams leaving the system as bottom products			

11. General Information

- A. Distillation column diameter
- B. Distillation column height
- C. Type of plates
- D. Plate spacing
- E. Murphree plate efficiency
- F. Any other information necessary to describe the operation of this distillation column.

12. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

RECORDKEEPING

REPORTING

TESTING

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION OR AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT OR AIR POLLUTION CONTROL DEVICE.

13. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NOTE: An *AIR POLLUTION CONTROL DEVICE SHEET* must be completed for any air pollution device(s) (except emergency relief devices) used to control emissions from this distillation column.

Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<http://www.epa.gov/tnn/chieff/>).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name Condensate Storage Tank
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) CTK-1	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) 15E
5. Date of Commencement of Construction (for existing tanks) 2015	
6. Type of change <input type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input checked="" type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. <div style="text-align: center;">400-bbl</div>	
9A. Tank Internal Diameter (ft) <div style="text-align: center;">12</div>	9B. Tank Internal Height (or Length) (ft) <div style="text-align: center;">20</div>
10A. Maximum Liquid Height (ft) <div style="text-align: center;">19</div>	10B. Average Liquid Height (ft) <div style="text-align: center;">14</div>
11A. Maximum Vapor Space Height (ft) <div style="text-align: center;">1</div>	11B. Average Vapor Space Height (ft) <div style="text-align: center;">6.57</div>
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. <div style="text-align: center;">16,074 gal</div>	

13A. Maximum annual throughput (gal/yr) 255,500	13B. Maximum daily throughput (gal/day) 700
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 15.89	
15. Maximum tank fill rate (gal/min) N/A	
16. Tank fill method <input checked="" type="checkbox"/> Submerged <input type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction: <input checked="" type="checkbox"/> Riveted <input type="checkbox"/> Gunite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)		
20A. Shell Color White	20B. Roof Color White	20C. Year Last Painted
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): 14.7 to 14.7		
24. Complete the following section for Vertical Fixed Roof Tanks <input type="checkbox"/> Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft) 0.06		
25. Complete the following section for Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal (check one) <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN - SLIDING COVER, GASKETED:	BUILT-UP COLUMN - SLIDING COVER, UNGASKETED:	PIPE COLUMN - FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN - SLIDING COVER, GASKETED:	PIPE COLUMN - SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: <div style="margin-left: 20px;"> <input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe) </div>	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMATION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based. Charleston, WV
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft ² ·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)		34B. Maximum (°F)	
35. Average operating pressure range of tank:			
35A. Minimum (psig)		35B. Maximum (psig)	
36A. Minimum Liquid Surface Temperature (°F)		36B. Corresponding Vapor Pressure (psia)	
37A. Average Liquid Surface Temperature (°F)		37B. Corresponding Vapor Pressure (psia)	
38A. Maximum Liquid Surface Temperature (°F)		38B. Corresponding Vapor Pressure (psia)	
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia)			
39G. Reid (psia)			
Months Storage per Year 39H. From			
39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

☐ Carbon Adsorption¹

☐ Condenser¹

☐ Conservation Vent (psig)

Vacuum Setting

Pressure Setting

☐ Emergency Relief Valve (psig)

☐ Inert Gas Blanket of

☐ Insulation of Tank with

☐ Liquid Absorption (scrubber)¹

☐ Refrigeration of Tank

☐ Rupture Disc (psig)

☐ Vent to Incinerator¹

☒ Other¹ (describe): Flare

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss		Annual Loss (lb/yr)	Estimation Method ¹
		Amount	Units		
	See Attachment N, Table 14				

¹ EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<http://www.epa.gov/tnn/chief/>).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name Condensate Storage Tank
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) CTK-2	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) 16E
5. Date of Commencement of Construction (for existing tanks) 2015	
6. Type of change <input type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input checked="" type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 400-bbl	
9A. Tank Internal Diameter (ft) 12	9B. Tank Internal Height (or Length) (ft) 20
10A. Maximum Liquid Height (ft) 19	10B. Average Liquid Height (ft) 14
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 6.57
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 16,074 gal	

13A. Maximum annual throughput (gal/yr) 255,500	13B. Maximum daily throughput (gal/day) 700
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 15.89	
15. Maximum tank fill rate (gal/min) N/A	
16. Tank fill method <input checked="" type="checkbox"/> Submerged <input type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction: <input checked="" type="checkbox"/> Riveted <input type="checkbox"/> Gunite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)		
20A. Shell Color White	20B. Roof Color White	20C. Year Last Painted
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): 14.7 to 14.7		
24. Complete the following section for Vertical Fixed Roof Tanks <input type="checkbox"/> Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft) 0.06		
25. Complete the following section for Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal (check one) <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN - SLIDING COVER, GASKETED:	BUILT-UP COLUMN - SLIDING COVER, UNGASKETED:	PIPE COLUMN - FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN - SLIDING COVER, GASKETED:	PIPE COLUMN - SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: <div style="margin-left: 20px;"> <input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe) </div>	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMATION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based. Charleston, WV
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft ² ·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)	34B. Maximum (°F)		
35. Average operating pressure range of tank:			
35A. Minimum (psig)	35B. Maximum (psig)		
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)		
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)		
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)		
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<http://www.epa.gov/tnn/chief/>).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name Condensate Storage Tank
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) CTK-3	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) 17E
5. Date of Commencement of Construction (for existing tanks) 2015	
6. Type of change <input type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input checked="" type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. <div style="text-align: center;">400-bbl</div>	
9A. Tank Internal Diameter (ft) <div style="text-align: center;">12</div>	9B. Tank Internal Height (or Length) (ft) <div style="text-align: center;">20</div>
10A. Maximum Liquid Height (ft) <div style="text-align: center;">19</div>	10B. Average Liquid Height (ft) <div style="text-align: center;">14</div>
11A. Maximum Vapor Space Height (ft) <div style="text-align: center;">1</div>	11B. Average Vapor Space Height (ft) <div style="text-align: center;">6.57</div>
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. <div style="text-align: center;">16,074 gal</div>	

13A. Maximum annual throughput (gal/yr) 255,500	13B. Maximum daily throughput (gal/day) 700
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 15.89	
15. Maximum tank fill rate (gal/min) N/A	
16. Tank fill method <input checked="" type="checkbox"/> Submerged <input type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction: <input checked="" type="checkbox"/> Riveted <input type="checkbox"/> Gunite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)		
20A. Shell Color White	20B. Roof Color White	20C. Year Last Painted
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): 14.7 to 14.7		
24. Complete the following section for Vertical Fixed Roof Tanks <input type="checkbox"/> Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft) 0.06		
25. Complete the following section for Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal (check one) <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIPE COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: <input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMATION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based. Charleston, WV
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft ² ·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)	34B. Maximum (°F)		
35. Average operating pressure range of tank:			
35A. Minimum (psig)	35B. Maximum (psig)		
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)		
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)		
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)		
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<http://www.epa.gov/tnn/chief/>).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name Produced Water Storage Tank
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) PTK-1	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) 18E
5. Date of Commencement of Construction (for existing tanks) 2015	
6. Type of change <input type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input checked="" type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
7A. Does the tank have more than one mode of operation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (e.g. Is there more than one product stored in the tank?)	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. <div style="text-align: center;">400-bbl</div>	
9A. Tank Internal Diameter (ft) <div style="text-align: center;">12</div>	9B. Tank Internal Height (or Length) (ft) <div style="text-align: center;">20</div>
10A. Maximum Liquid Height (ft) <div style="text-align: center;">19</div>	10B. Average Liquid Height (ft) <div style="text-align: center;">14</div>
11A. Maximum Vapor Space Height (ft) <div style="text-align: center;">1</div>	11B. Average Vapor Space Height (ft) <div style="text-align: center;">6.57</div>
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. <div style="text-align: center;">16,074 gal</div>	

13A. Maximum annual throughput (gal/yr) 1,277,500	13B. Maximum daily throughput (gal/day) 3,500
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) 79.47	
15. Maximum tank fill rate (gal/min) N/A	
16. Tank fill method <input checked="" type="checkbox"/> Submerged <input type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year
18. Type of tank (check all that apply): <input checked="" type="checkbox"/> Fixed Roof <input checked="" type="checkbox"/> vertical <input type="checkbox"/> horizontal <input type="checkbox"/> flat roof <input type="checkbox"/> cone roof <input type="checkbox"/> dome roof <input type="checkbox"/> other (describe) <input type="checkbox"/> External Floating Roof <input type="checkbox"/> pontoon roof <input type="checkbox"/> double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> vertical column support <input type="checkbox"/> self-supporting <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> lifter roof <input type="checkbox"/> diaphragm <input type="checkbox"/> Pressurized <input type="checkbox"/> spherical <input type="checkbox"/> cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe)	

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction: <input checked="" type="checkbox"/> Riveted <input type="checkbox"/> Gunite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)		
20A. Shell Color White	20B. Roof Color White	20C. Year Last Painted
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): 14.7 to 14.7		
24. Complete the following section for Vertical Fixed Roof Tanks <input type="checkbox"/> Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft) 0.06		
25. Complete the following section for Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal (check one) <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: <ul style="list-style-type: none"> <input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe) 	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMATION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based. Charleston, WV
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft ² ·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)	34B. Maximum (°F)		
35. Average operating pressure range of tank:			
35A. Minimum (psig)	35B. Maximum (psig)		
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)		
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)		
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)		
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia)			
39G. Reid (psia)			
Months Storage per Year 39H. From			
39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

☐ Carbon Adsorption¹

☐ Condenser¹

☐ Conservation Vent (psig)

Vacuum Setting

Pressure Setting

☐ Emergency Relief Valve (psig)

☐ Inert Gas Blanket of

☐ Insulation of Tank with

☐ Liquid Absorption (scrubber)¹

☐ Refrigeration of Tank

☐ Rupture Disc (psig)

☐ Vent to Incinerator¹

☒ Other¹ (describe): Flare

¹ Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss		Annual Loss (lb/yr)	Estimation Method ¹
		Amount	Units		
	See Attachment N, Table 14				

¹ EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<http://www.epa.gov/tnn/chief/>).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name Produced Water Storage Tank
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) PTK-2	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) 19E
5. Date of Commencement of Construction (for existing tanks) 2015	
6. Type of change <input type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input checked="" type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. <div style="text-align: right;">400-bbl</div>	
9A. Tank Internal Diameter (ft) <div style="text-align: center;">12</div>	9B. Tank Internal Height (or Length) (ft) <div style="text-align: center;">20</div>
10A. Maximum Liquid Height (ft) <div style="text-align: center;">19</div>	10B. Average Liquid Height (ft) <div style="text-align: center;">14</div>
11A. Maximum Vapor Space Height (ft) <div style="text-align: center;">1</div>	11B. Average Vapor Space Height (ft) <div style="text-align: center;">6.57</div>
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. <div style="text-align: right;">16,074 gal</div>	

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)			
19. Tank Shell Construction:			
<input checked="" type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)			
20A.	Shell Color	White	20B. Roof Color White 20C. Year Last Painted
21. Shell Condition (if metal and unlined):			
<input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable			
22A.	Is the tank heated?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
22B.	If YES, provide the operating temperature (°F)		
22C.	If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): 14.7 to 14.7			
24. Complete the following section for Vertical Fixed Roof Tanks			<input type="checkbox"/> Does Not Apply
24A.	For dome roof, provide roof radius (ft)		
24B.	For cone roof, provide slope (ft/ft) 0.06		
25. Complete the following section for Floating Roof Tanks			<input checked="" type="checkbox"/> Does Not Apply
25A.	Year Internal Floaters Installed:		
25B.	Primary Seal Type: (check one)	<input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Vapor Mounted Resilient Seal	<input type="checkbox"/> Liquid Mounted Resilient Seal <input type="checkbox"/> Other (describe):
25C.	Is the Floating Roof equipped with a Secondary Seal?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
25D.	If YES, how is the secondary seal mounted? (check one)	<input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):	
25E.	Is the Floating Roof equipped with a weather shield?	<input type="checkbox"/> YES <input type="checkbox"/> NO	

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIPE COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam:	
<input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMATION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based. Charleston, WV
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft ² ·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)	34B. Maximum (°F)		
35. Average operating pressure range of tank:			
35A. Minimum (psig)	35B. Maximum (psig)		
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)		
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)		
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)		
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia)			
39G. Reid (psia)			
Months Storage per Year 39H. From			
39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

☐ Carbon Adsorption¹

☐ Condenser¹

☐ Conservation Vent (psig)

Vacuum Setting

Pressure Setting

☐ Emergency Relief Valve (psig)

☐ Inert Gas Blanket of

☐ Insulation of Tank with

☐ Liquid Absorption (scrubber)¹

☐ Refrigeration of Tank

☐ Rupture Disc (psig)

☐ Vent to Incinerator¹

☒ Other¹ (describe): Flare

¹ Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss		Annual Loss (lb/yr)	Estimation Method ¹
		Amount	Units		
	See Attachment N, Table 14				

¹ EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L EMISSIONS UNIT DATA SHEET STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (<http://www.epa.gov/tnn/chief/>).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name Produced Water Storage Tank
3. Tank Equipment Identification No. (as assigned on <i>Equipment List Form</i>) PTK-3	4. Emission Point Identification No. (as assigned on <i>Equipment List Form</i>) 20E
5. Date of Commencement of Construction (for existing tanks) 2015	
6. Type of change <input type="checkbox"/> New Construction <input type="checkbox"/> New Stored Material <input checked="" type="checkbox"/> Other Tank Modification	
7. Description of Tank Modification (if applicable) Updated production	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. <div style="text-align: right;">400-bbl</div>	
9A. Tank Internal Diameter (ft) <div style="text-align: center;">12</div>	9B. Tank Internal Height (or Length) (ft) <div style="text-align: center;">20</div>
10A. Maximum Liquid Height (ft) <div style="text-align: center;">19</div>	10B. Average Liquid Height (ft) <div style="text-align: center;">14</div>
11A. Maximum Vapor Space Height (ft) <div style="text-align: center;">1</div>	11B. Average Vapor Space Height (ft) <div style="text-align: center;">6.57</div>
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. <div style="text-align: right;">16,074 gal</div>	

13A. Maximum annual throughput (gal/yr) <div style="text-align: center;">1,277,500</div>	13B. Maximum daily throughput (gal/day) <div style="text-align: center;">3,500</div>
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) <div style="text-align: center;">79.47</div>	
15. Maximum tank fill rate (gal/min) N/A	
16. Tank fill method <input checked="" type="checkbox"/> Submerged <input type="checkbox"/> Splash <input type="checkbox"/> Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems <input checked="" type="checkbox"/> Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year
18. Type of tank (check all that apply): <div style="padding-left: 20px;"> <input checked="" type="checkbox"/> Fixed Roof x vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe) <input type="checkbox"/> External Floating Roof ___ pontoon roof ___ double deck roof <input type="checkbox"/> Domed External (or Covered) Floating Roof <input type="checkbox"/> Internal Floating Roof ___ vertical column support ___ self-supporting <input type="checkbox"/> Variable Vapor Space ___ lifter roof ___ diaphragm <input type="checkbox"/> Pressurized ___ spherical ___ cylindrical <input type="checkbox"/> Underground <input type="checkbox"/> Other (describe) </div>	

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction: <input checked="" type="checkbox"/> Riveted <input type="checkbox"/> Gunite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)		
20A. Shell Color White	20B. Roof Color White	20C. Year Last Painted
21. Shell Condition (if metal and unlined): <input checked="" type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable		
22A. Is the tank heated? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): 14.7 to 14.7		
24. Complete the following section for Vertical Fixed Roof Tanks <input type="checkbox"/> Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft) 0.06		
25. Complete the following section for Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: <input type="checkbox"/> Metallic (Mechanical) Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal (check one) <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? <input type="checkbox"/> YES <input type="checkbox"/> NO		
25D. If YES, how is the secondary seal mounted? (check one) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? <input type="checkbox"/> YES <input type="checkbox"/> NO		

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks <input checked="" type="checkbox"/> Does Not Apply	
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: <input type="checkbox"/> Continuous sheet construction 5 feet wide <input type="checkbox"/> Continuous sheet construction 6 feet wide <input type="checkbox"/> Continuous sheet construction 7 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 7.5 feet wide <input type="checkbox"/> Continuous sheet construction 5 × 12 feet wide <input type="checkbox"/> Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft ²)
For column supported tanks:	26G. Diameter of each column:
26F. Number of columns:	

IV. SITE INFORMATION (optional if providing TANKS Summary Sheets)

27. Provide the city and state on which the data in this section are based. Charleston, WV
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft ² ·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:			
34A. Minimum (°F)	34B. Maximum (°F)		
35. Average operating pressure range of tank:			
35A. Minimum (psig)	35B. Maximum (psig)		
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)		
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)		
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)		
39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Attachment L FUGITIVE EMISSIONS FROM UNPAVED HAULROADS

UNPAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

		PM		PM-10	
k =	Particle size multiplier	0.80		0.36	
s =	Silt content of road surface material (%)	10		10	
p =	Number of days per year with precipitation >0.01 in.	150		150	

Item Number	Description	Number of Wheels	Mean Vehicle Weight (tons)	Mean Vehicle Speed (mph)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1	Light Vehicles	4	2.5	10	2	1	730	1	55
2	Heavy Trucks	18	23.7	10	2	1	730	1	55
3									
4									
5									
6									
7									
8									

Source: AP-42 Fifth Edition – 13.2.2 Unpaved Roads

$$E = k \times 5.9 \times (s + 12) \times (S + 30) \times (W + 3)^{0.7} \times (w + 4)^{0.5} \times ((365 - p) + 365) = \text{lb/Vehicle Mile Traveled (VMT)}$$

Where:

		PM	PM-10
k =	Particle size multiplier	0.80	0.36
s =	Silt content of road surface material (%)	10	10
S =	Mean vehicle speed (mph)	10	10
W =	Mean vehicle weight (tons)	13	13
w =	Mean number of wheels per vehicle	11	11
p =	Number of days per year with precipitation >0.01 in.	150	150

For lb/hr: $[\text{lb} \div \text{VMT}] \times [\text{VMT} \div \text{trip}] \times [\text{Trips} \div \text{Hour}] = \text{lb/hr}$

For TPY: $[\text{lb} \div \text{VMT}] \times [\text{VMT} \div \text{trip}] \times [\text{Trips} \div \text{Hour}] \times [\text{Ton} \div 2000 \text{ lb}] = \text{Tons/year}$

SUMMARY OF UNPAVED HAULROAD EMISSIONS

Item No.	PM				PM-10			
	Uncontrolled lb/hr		Controlled TPY		Uncontrolled lb/hr		Controlled TPY	
1	1.64	7.20	0.74	3.24	0.49	2.13	0.22	0.96
2								
3								
4								
5								
6								
7								
8								
TOTALS	1.64	7.20	0.74	3.24	0.49	2.13	0.22	0.96

FUGITIVE EMISSIONS FROM PAVED HAULROADS

INDUSTRIAL PAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

I =	Industrial augmentation factor (dimensionless)	N/A
n =	Number of traffic lanes	
s =	Surface material silt content (%)	
L =	Surface dust loading (lb/mile)	

Item Number	Description	Mean Vehicle Weight (tons)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1							
2							
3							
4							
5							
6							
7							
8							

Source: AP-42 Fifth Edition – 11.2.6 Industrial Paved Roads

$$E = 0.077 \times I \times (4 \div n) \times (s \div 10) \times (L \div 1000) \times (W \div 3)^{0.7} =$$

lb/Vehicle Mile Traveled (VMT)

Where:

I =	Industrial augmentation factor (dimensionless)	
n =	Number of traffic lanes	
s =	Surface material silt content (%)	
L =	Surface dust loading (lb/mile)	
W =	Average vehicle weight (tons)	

For lb/hr: $[lb \div VMT] \times [VMT \div trip] \times [Trips \div Hour] =$ lb/hr

For TPY: $[lb \div VMT] \times [VMT \div trip] \times [Trips \div Hour] \times [Ton \div 2000 lb] =$ Tons/year

SUMMARY OF PAVED HAULROAD EMISSIONS

Item No.	Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY
1				
2				
3				
4				
5				
6				
7				
8				
TOTALS				

Attachment M: Air Pollution Control Device Sheet(s)

Attachment M
Air Pollution Control Device Sheet
 (FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): CTRL-1

Equipment Information

1. Manufacturer: NOV Model No. MEVC200	2. Method: <input type="checkbox"/> Elevated flare <input type="checkbox"/> Ground flare <input checked="" type="checkbox"/> Other Describe Enclosed Vapor Combustor
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. Method of system used: <input type="checkbox"/> Steam-assisted <input type="checkbox"/> Air-assisted <input type="checkbox"/> Pressure-assisted <input checked="" type="checkbox"/> Non-assisted	
5. Maximum capacity of flare: <div style="text-align: right;">scf/min</div> <div style="text-align: right;">scf/hr</div>	6. Dimensions of stack: <div style="text-align: right;">Diameter 4 ft.</div> <div style="text-align: right;">Height 20 ft.</div>
7. Estimated combustion efficiency: (Waste gas destruction efficiency) Estimated: 98 % Minimum guaranteed: 98 %	8. Fuel used in burners: <input checked="" type="checkbox"/> Natural Gas <input type="checkbox"/> Fuel Oil, Number <input type="checkbox"/> Other, Specify:
9. Number of burners: Rating: 18.42 MM BTU/hr	11. Describe method of controlling flame: Two flame arrestors
10. Will preheat be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
12. Flare height: 25 ft	14. Natural gas flow rate to flare pilot flame per pilot light: <div style="text-align: right;">scf/min</div> <div style="text-align: right;">49.01961 scf/hr</div>
13. Flare tip inside diameter: 0.75 ft	
15. Number of pilot lights: Total 0.05 MM BTU/hr	16. Will automatic re-ignition be used? <div style="text-align: right;"><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</div>
17. If automatic re-ignition will be used, describe the method: The flare pilot switches shall automatically trigger the ignition transformers to ignite the flare tip pilot.	
18. Is pilot flame equipped with a monitor? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, what type? <input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-Red <input type="checkbox"/> Ultra Violet <input type="checkbox"/> Camera with monitoring control room <input type="checkbox"/> Other, Describe:	
19. Hours of unit operation per year: 8,760	

Steam Injection

20. Will steam injection be used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Steam pressure Minimum Expected: Design Maximum:	PSIG
22. Total Steam flow rate:	LB/hr	23. Temperature:
24. Velocity	ft/sec	25. Number of jet streams
26. Diameter of steam jets:	in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?		

Characteristics of the Waste Gas Stream to be Burned

29.	Name	Quantity Grains of H ₂ S/100 ft ³	Quantity (LB/hr, ft ³ /hr, etc)	Source of Material
	Tank Vapor	N/A	61.23 lb/hr	CTK1-3, PTK1-3
30.	Estimate total combustible to flare:		61.23 lb/hr	LB/hr or ACF/hr
	(Maximum mass flow rate of waste gas)			scfm
31.	Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.:			
	61.23 lb/hr		LB/hr or ACF/hr	
32.	Give composition of carrier gases: See Promax			
33.	Temperature of emission stream: °F		34. Identify and describe all auxiliary fuels to be burned.	
	Heating value of emission stream: 1020 BTU/ft ³		BTU/scf	
	Mean molecular weight of emission stream: MW = lb/lb-mole		BTU/scf	
			BTU/scf	
35.	Temperature of flare gas: N/A °F		36. Flare gas flow rate: 50 scf/min	
37.	Flare gas heat content: 1020 BTU/ft ³		38. Flare gas exit velocity: N/A scf/min	
39.	Maximum rate during emergency for one major piece of equipment or process unit: N/A scf/min			
40.	Maximum rate during emergency for one major piece of equipment or process unit: N/A BTU/min			
41.	Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): N/A			
42.	Describe the collection material disposal system: Tanks are routed to combustor			
43.	Have you included Flare Control Device in the Emissions Points Data Summary Sheet? Yes			

44. Proposed Monitoring, Recordkeeping, Reporting, and Testing Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING: Operator to check during routine walkthroughs.	RECORDKEEPING: Operator will keep records if combustor is found non-operational.
REPORTING: Notifications will be made as required.	TESTING: Testing will be conducted as required.
MONITORING: RECORDKEEPING: REPORTING: TESTING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device. Please describe the proposed recordkeeping that will accompany the monitoring. Please describe any proposed emissions testing for this process equipment on air pollution control device. Please describe any proposed emissions testing for this process equipment on air pollution control device.
45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant. 98% VOC	
46. Manufacturer's Guaranteed Control Efficiency for each air pollutant. 98% VOC	
47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty. N/A	



QUOTATION

CLIENT: American Energy Partners, LP

SUBJECT: Mission Enclosed Vapor Combustor (MEVC200)

NOV PROPOSAL: H-14100-14-200 Rev.2

0	5/19/14	TW	RC	PM	Quotation
REV	DATE	BY	CHECKED	APPROVED	COMMENTS

NOV
10011 MEADOWGLEN LANE, 2ND FLOOR
HOUSTON, TX 77042
TEL: 1-713-395-5000 FAX: 1-713-395-5001

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1 COMMERCIAL AND TECHNICAL

1.1 Introduction

In response to your inquiry, NOV is pleased to offer the following proposal for a NOV Mission Enclosed Vapor Combustor (MEVC). The model MEVC200 is capable of 18.42 MMBTU/HR, Medium Temperature Flares (MTF). NOV Mission offers a full line of reliable enclosed combustors for the ever changing requirements of today's regulation filled oil and gas industry. Mission's MEVC design incorporates years of experience with tank vapors with a combustor design which is highly effective, tested and certified "99%" for destruction of vent emissions from oil and condensate tank batteries, loading operations and storage facilities. NOV's stainless steel enclosed flare design is capable of meeting industry regulations while offering significant cost savings. Scalable to customer application, this flare is proven throughout the world. The following items will show the advantages and benefits to incorporating this equipment into the Storage Tank facility:

APPLICATIONS

- Associated gas
- Dehydrators
- Pipeline blow down
- Oil and condensate loading facilities
- Equipment maintenance
- Oil and condensate storage tanks

FEATURES AND BENEFITS:

- Meets EPA 40 CFR 60.00 regulations
- Remote location solar panel option available
- 98%+ destruction efficiency (independent 3rd party tested)
- Flexible & fully automated and programmable system (additional parameters optional)
- Quad O compliant ready
- Special custom application larger units available
- Low capital and operating costs
- Very high turndown ratio
- Scalable flow rates
- Field proven design
- Only requires 300 btu/ft3 gas to maintain combustion
- High Temperature Flares (HTF) with 99.99% DRE are also available

Thank you for this opportunity to quote on your combustor needs. Should you have any questions or concerns regarding the commercial terms, the scope of supply offered, or any technical points which may need clarification, please feel free to contact NOV at:

Contact : Pete Magnani
Email : pete.magnani@nov.com
Telephone : 1-713-395-5000
Fax : 1-713-395-5001
Address : 10011 Meadowglen Lane, 2nd Floor
Houston, TX 77042
USA

- **Flare Gas Stream: 5.4 MW MTF:**
 - Type: Enclosed Tank Battery Flare
 - Composition: 2200 btu/ft³ gas
 - Temperature: Ambient to 100°F +/- 20 deg°F
 - Flow Rate: up to 200,000 scfd (based on 2200 BTU /ft³ gas) or 139.6 scfm
 - Auxiliary Fuel Requirements N/A
 - Burner Size 18.42 million BTU/hr (5.4 MW)
 - Inlet Pressure Requirements 2-4 oz/in² (3.5-7.0 “w.c.)
 - Turndown Ratio 5:1
 - Data points recorded include combustion temperature, operation pressure, and run time
- **Mechanical:**
 - Design Wind Speed 100 mph
 - Ambient Temperature -20 deg F up to 110 deg F
 - Electrical Area Classification General Area Classification (non-hazardous)
 - Elevation Up to 3,000 ft ASL – please advise if higher elevation
- **Process:**
 - Smokeless Capacity 100% Sdf
 - Operating Temperature 1400 deg F to 2100 deg F (1500 deg F Nominal); Retention Time 0.3 sec.
 - Flare Inlet Pressure 2-4 oz/in² (3.5-7.0 “w.c.)
- **Utilities:**
 - Pilot Gas Process Gas
 - Electricity 24VDC Panel/ 10A (Solar Option) Auxiliary Fuel N/A
 - Instrument air/gas 80 psig for valve actuation.
- **Emissions:**
 - Destruction Efficiency: 98% DRE

1.4 Delivery

The delivery for the Equipment listed in NOV Scope of Supply is as follows:

- **Delivery:**
 - 2-3 weeks ARO, Ex-Works Chattanooga, TN

1.5 Commercial Clarifications/Exceptions

- 1.5.1 Terms are net 30 days:
 - 100% - Upon notice of readiness to ship.
- 1.5.2 Quoted prices exclude all taxes, import duties, freight and/or insurance charges.
- 1.5.3 Delivery to be confirmed upon acceptance of purchase order.
- 1.5.4 NOV Worldwide Terms and Conditions shall apply.

1.5.7 NOV standard documentation will apply.

1.6 Quotation Validity

Validity is 30 days from the date of this proposal.

1.7 Service

Available upon request.

2 ATTACHMENTS

2.1 NOV Documents

- NOV Terms and Conditions

Attachment N: Supporting Emissions Calculations

TABLE 1

FACILITY-WIDE POTENTIAL CRITERIA POLLUTANT EMISSIONS SUMMARY
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Emissions Source	Emission Point Identification	Criteria Pollutants ¹									
		NO _x		VOC		CO		PM		Total HAPs	
		(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
HiPower PSI/GM 3.0L Generator (47 Hp)	9E ⁽²⁾	0.29	1.27	0.01	0.05	0.50	2.18	0.01	0.03	0.02	0.07
Gas Production Unit (1.50 MMBtu/hr)	1E ⁽³⁾	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	2E ⁽³⁾	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Gas Production Unit (1.50 MMBtu/hr)	3E ⁽³⁾	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Line Heater (1.50 MMBtu/hr)	4E ⁽³⁾	0.15	0.64	0.01	0.04	0.12	0.54	0.01	0.05	0.003	0.01
Flash Separator Heater (1.00 MMBtu/hr)	7E ⁽³⁾	0.10	0.43	0.01	0.02	0.08	0.36	0.01	0.03	0.002	0.01
Condensate Stabilizer Heater (0.75 MMBtu/hr)	11E ⁽³⁾	0.07	0.32	0.01	0.02	0.06	0.27	0.01	0.02	0.002	0.01
Condensate Storage Tank (400-bbl)	15E ⁽⁴⁾	----	----	----	1.82	----	----	----	----	----	0.001
Condensate Storage Tank (400-bbl)	16E ⁽⁴⁾	----	----	----	1.82	----	----	----	----	----	0.001
Condensate Storage Tank (400-bbl)	17E ⁽⁴⁾	----	----	----	1.82	----	----	----	----	----	0.001
Produced Water Storage Tank (400-bbl)	18E ⁽⁴⁾	----	----	----	0.01	----	----	----	----	----	0.001
Produced Water Storage Tank (400-bbl)	19E ⁽⁴⁾	----	----	----	0.01	----	----	----	----	----	0.001
Produced Water Storage Tank (400-bbl)	20E ⁽⁴⁾	----	----	----	0.01	----	----	----	----	----	0.001
Enclosed Combustor (18.42 MMBtu/hr)	10E ⁽⁵⁾	1.25	5.49	1.22	5.36	6.82	29.85	----	----	----	0.001
Condensate Truck Loading	12E ⁽⁶⁾	----	----	58.95	2.82	----	----	----	----	0.02	0.001
Produced Water Truck Loading	13E ⁽⁷⁾	----	----	0.59	0.14	----	----	----	----	0.001	0.001
Fugitive VOC Emissions	14E ⁽⁸⁾	----	----	2.13	9.27	----	----	----	----	0.01	0.03
Total Facility Emissions		2.31	10.07	62.96	23.33	7.94	34.82	0.07	0.28	0.06	0.17

Notes:

- 1 . Emissions of SO₂ are assumed to be negligible since pipeline-quality natural gas is used as fuel.
Refer to Table 2 for HAP emissions, Table 3 for road emissions, and Table 4 for GHG emissions.
- 2 . Refer to Table 5 for engine(s) potential emissions calculations.
- 3 . Refer to Tables 6-11 for heater(s) potential emissions calculations.
- 4 . Refer to Tables 12-14 for storage tank(s) potential emissions calculations.
- 5 . Refer to Table 15 for combustor(s) potential emissions calculations.
- 6 . Refer to Table 16 for condensate truck loading potential emissions calculations.
- 7 . Refer to Table 17 for produced water truck loading potential emissions calculations.
- 8 . Refer to Tables 18-19 for process piping fugitives potential emissions calculations.

FACILITY-WIDE POTENTIAL HAP EMISSIONS SUMMARY
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Notes:

- AttachmentN_Criswell_Calcs-REV

TABLE 3

**FACILITY-WIDE POTENTIAL ROAD EMISSIONS SUMMARY
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Emissions Source	Emission Point Identification	Pollutants					
		PM _{2.5}		PM ₁₀		PM _{TOT}	
		(lb/hr)	(T/yr)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
Unpaved Roads	21E ¹	0.02	0.10	0.22	0.96	0.74	3.24
Total Facility Emissions		0.02	0.10	0.22	0.96	0.74	3.24

Notes:

1. Refer to Table 19 for unpaved road source(s) potential emissions calculations.

TABLE 4

ESTIMATION OF FACILITY-WIDE GHG EMISSIONS
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

GHG Emission Source	Total GHG Emissions	
	(m.t. CO ₂ e)	(tons CO ₂ e)
Natural Gas Combustion	3,790	4,184
Tanks	283	290
Fugitives	366	403
Flares	11,725	12,925
Total Estimated Facility Emissions:	16,151	17,803

Conversion Factors		Global Warming Potential	
1.10231	ton/m.t.	CO ₂	1
0.001	m.t./kg	CH ₄	25
8,760	Hrs/yr	N ₂ O	298

CO ₂ (mol %)	CH ₄ (mol %)	C ₂ H ₆ (mol %)	C ₃ H ₈ (mol %)	C ₄ H ₁₀ (mol %)	C ₅ + (mol %)
0.17%	70.70%	13.72%	3.89%	1.44%	0.84%

Note:

Carbon Dioxide Equivalent (CO₂e) emissions are calculated in the tables below by multiplying emissions by global warming potentials for each pollutant.

Emissions estimates converted to short tons in the tables below using conversion factor from 40 CFR 98 Subpart A.

Global Warming Potentials obtained from 40 CFR 98 Subpart A, Table A-1.

Mol % values obtained from the gas analysis from a representative facility.

Natural Gas & Diesel Combustion Emissions

Emissions Source	Emission Point Identification	Rated Horsepower	Capacity (MMBtu/hr)	BSFC (Btu/hp-hr)	Operation (hr/yr)	Emissions Factors ¹			Emissions ² (m.t.)			Emissions (m.t. CO ₂ e)			Total Emissions	
						CO ₂ (kg/MMBtu)	CH ₄ (kg/MMBtu)	N ₂ O (kg/MMBtu)	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	(m.t. CO ₂ e)	CO ₂ e
HiPower PSUGM 3.0L Generator (47 Hp)	9E	47	0.41	8,681	8,760	53.06	0.001	0.0001	189.84	0.004	0.0004	189.84	0.00	0.107	190	209
Gas Production Unit (1.50 MMBtu/hr)	1E	—	1.50	—	8,760	53.06	0.001	0.0001	607.21	0.013	0.0013	607.21	0.33	0.302	608	760
Gas Production Unit (1.50 MMBtu/hr)	2E	—	1.50	—	8,760	53.06	0.001	0.0001	607.21	0.013	0.0013	607.21	0.33	0.30	608	760
Gas Production Unit (1.50 MMBtu/hr)	3E	—	1.50	—	8,760	53.06	0.001	0.0001	607.21	0.013	0.0013	607.21	0.33	0.30	608	760
Line Heater (1.50 MMBtu/hr)	4E	—	1.50	—	8,760	53.06	0.001	0.0001	607.21	0.013	0.0013	607.21	0.33	0.30	608	760
Flash Separator Heater (1.00 MMBtu/hr)	7E	—	1.00	—	8,760	53.06	0.001	0.0001	464.81	0.009	0.0009	464.81	0.22	0.26	465	513
Condensate Stabilizer Heater (0.75 MMBtu/hr)	11E	—	0.75	—	8,760	53.06	0.001	0.0001	346.80	0.007	0.0007	346.80	0.16	0.196	349	395
Total Natural Gas Combustion:															3,790	4,184

Notes:

1. Emission factors for GHG obtained from 40 CFR 98 Subpart C, Tables C-1 and C-2.

Tank Sources

Emissions Source	Emission Point Identification	Annual Condensate Production (bbl/yr)	Annual Condensate Production (1,000 gal/yr)	Default Liquid CH ₄ Content ¹ (mol %)	Average API Gravity	Average Separator Pressure (psig)	Separator Temperature (°F)	Dissolved Gas Gravity (SG _g)	Actual VOC Gas/Oil Ratio (scf/bbl oil)	Emissions ¹ CH ₄ (m.t.)	Total Emissions		Control Efficiency (%)	Total Controlled Emissions	
											(m.t. CO ₂ e)	(tons CO ₂ e)		(m.t. CO ₂ e)	(tons CO ₂ e)
Condensate Storage Tank (400-bbl)	CTK-1	6,083	256	27.4	63	100	80	0.90	888.00	28.32	708.02	780.46	98%	14.16	15.61
Condensate Storage Tank (400-bbl)	CTK-2	6,083	256	27.4	63	100	80	0.90	888.00	28.32	708.02	780.46	98%	14.16	15.61
Condensate Storage Tank (400-bbl)	CTK-3	6,083	256	27.4	63	100	80	0.90	888.00	28.32	708.02	780.46	98%	14.16	15.61
Produced Water Storage Tank (400-bbl)	PTK-1	30,417	1,278	27.4	63	100	80	0.90	888.00	1.42	35.40	38.02	98%	0.71	0.78
Produced Water Storage Tank (400-bbl)	PTK-2	30,417	1,278	27.4	63	100	80	0.90	888.00	1.42	35.40	38.02	98%	0.71	0.78
Produced Water Storage Tank (400-bbl)	PTK-3	30,417	1,278	27.4	63	100	80	0.90	888.00	1.42	35.40	38.02	98%	0.71	0.78
Total Tanks:														45	49

Notes:

1. Default CH₄ content for crude oil per API compendium Section 5.4 and Appendix B.

2. Emissions estimated using API Compendium, Section 5.4.

Truck Loading

Emissions Source	Emission Point Identification	Annual Condensate Production (bbl/yr)	Annual Condensate Production (1,000 gal/yr)	Default Liquid CH ₄ Content ¹ (mol %)	Emission Factor VOC (lb/1,000 gal)	Emissions ² VOC (tons)		Emissions ¹ CH ₄ (m.t.)	Total Emissions	
						CO ₂	CH ₄		(m.t. CO ₂ e)	(tons CO ₂ e)
Condensate Truck Loading	12E	18,250	767	27.4	55.00	21.08	19.12	5.24	131	144
Produced Water Truck Loading	13E	91,250	3,633	27.4	7.37	14.12	12.81	3.51	88	97
Total Loading:									210	241

Notes:

1. Default CH₄ content for crude oil per API compendium Section 5.4 and Appendix B.

2. Emissions estimated using API Compendium, Section 5.5.

Fugitive Sources

Source Type/Service ¹	Number of Sources	Maximum Hours of Operation	CO ₂ (mol %)	CH ₄ (mol %)	Emission Factor CH ₄ (m.t./hr/component)	Emissions ² CO ₂ (m.t.)		Emissions ² CH ₄ (m.t.)		Total Emissions	
						CO ₂	CH ₄	CO ₂	CH ₄	(m.t. CO ₂ e)	(tons CO ₂ e)
Valves - Gas/Vapor	200	8,760	0.0017	0.7970	0.0000045	0.0358	6.28	0.0358	157.09	157.13	173.20
Flanges - Gas/Vapor	700	8,760	0.0017	0.7970	0.0000039	0.0108	1.91	0.0108	47.65	47.66	52.54
Compressor Seals - Gas/Vapor	0	8,760	0.0017	0.7970	0.0000024	0.0000	0.00	0.0000	0.00	0.00	0.00
Relief Valves - Gas/Vapor	20	8,760	0.0017	0.7970	0.000017	0.0135	2.37	0.0135	59.39	59.39	65.43
Valves - Light Liquid	200	8,760	0.0017	0.7970	0.0000025	0.0109	3.49	0.0109	87.27	87.29	96.22
Flanges - Light Liquid	25	8,760	0.0017	0.7970	0.0000011	0.00011	0.02	0.00011	0.48	0.48	0.53
Pump Seals - Light Liquid	0	8,760	0.0017	0.7970	0.000013	0.0000	0.00	0.0000	0.00	0.00	0.00
Relief Valves - Light Liquid	15	8,760	0.0017	0.7970	0.00000539	0.0032	0.68	0.0032	14.11	14.12	15.56
Total Fugitives:										366	403

Notes:

1. Number of each component and type of service estimated based on a similar station.

2. Emission estimated using API Compendium, Section 6.0, Tables 6-12 and 6-21.

Flares

Emissions Source	Emission Point Identification	Burner Rating (MMBtu/hr)	Annual Gas Usage ¹ (scf/yr)	CO ₂ (mol %)	CH ₄ (mol %)	Emission Factor N ₂ O (m.t./MMBtu)	Emissions ² CO ₂ (m.t.)			Emissions (m.t. CO ₂ e)			Total Emissions	
							CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	(m.t. CO ₂ e)	(tons CO ₂ e)
Enclosed Combustor (18.42 MMBtu/hr)	10E	18.4	158,165,294	0.0017	0.7970	5.96E-07	10,519	48	0.00009	10,519	1,205	0.028	11,725	12,925
Total Flare Emissions:													11,725	12,925

Notes:

1. Annual gas usage calculated using the gas heating value of 1,020 Btu/scf.

2. Emissions estimated using API Compendium, Section 4.6 for Flare Emissions.

TABLE 5

**POTENTIAL EMISSIONS SUMMARY
HIPOWER PSI/GM 3.0L GENERATOR (ENG2)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Pollutant ¹	Horsepower	Emission Factors ²	Potential Emission Rate ³	
			(lb/hr)	(T/yr)
NO _x	47	2.80	0.29	1.27
VOC	47	0.0296	0.01	0.05
CO	47	4.80	0.50	2.18
PM	47	0.01941	0.01	0.03
FORMALDEHYDE	47	0.0205	0.01	0.04
ACETALDEHYDE	47	0.00836	0.003	0.01
ACROLEIN	47	0.00514	0.002	0.01
METHANOL	47	0.0025	0.001	0.004
n-HEXANE	47	0.00111	0.0005	0.002
BENZENE	47	0.00044	0.0002	0.001
TOLUENE	47	0.000408	0.0002	0.001
ETHYL-BENZENE	47	0.0000397	<0.0001	0.0001
XYLENES	47	0.000184	0.0001	0.0003

Notes:

1. Emissions of SO₂ are assumed to be negligible and not reportable.
2. Emission Factors obtained from NSPS Subpart JJJJ and AP-42.

NO _x =	2.80	g/hp-hr NSPS Subpart JJJJ preamble Table 3, January 18, 2008.
VOC =	0.0296	lb/MMBtu AP-42 Table 3.2-2.
CO =	4.80	g/hp-hr NSPS Subpart JJJJ preamble Table 3, January 18, 2008.
PM =	0.01941	lb/MMBtu AP-42 Table 3.2-2.
formaldehyde =	0.0205	lb/MMBtu AP-42 Table 3.2-2.
Acetaldehyde =	0.00836	lb/MMBtu AP-42 Table 3.2-2
Acrolein =	0.00514	lb/MMBtu AP-42 Table 3.2-2
Methanol =	0.0025	lb/MMBtu AP-42 Table 3.2-2
N-Hexane =	0.00111	lb/MMBtu AP-42 Table 3.2-2
Benzene =	0.00044	lb/MMBtu AP-42 Table 3.2-2
Toluene =	0.000408	lb/MMBtu AP-42 Table 3.2-2
Ethyl-Benzene =	0.0000397	lb/MMBtu AP-42 Table 3.2-2
Xylenes =	0.000184	lb/MMBtu AP-42 Table 3.2-2

3. Potential emissions based on emission factors, maximum horsepower, a brake specific fuel consumption of 8,681 btu/hp-hr, and 8,760 hours of operation per year.

TABLE 6

**POTENTIAL EMISSIONS SUMMARY
GAS PRODUCTION UNIT (GPU-1)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Pollutant ¹	Emission Factors ² (lb/MMSCF)	Potential Emission Rates ³	
		(lb/hr)	(T/yr)
NO _x	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

TABLE 7

**POTENTIAL EMISSIONS SUMMARY
GAS PRODUCTION UNIT (GPU-2)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Pollutant ¹	Emission Factors ² (lb/MMSCF)	Potential Emission Rates ³	
		(lb/hr)	(T/yr)
NO _x	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

TABLE 8

**POTENTIAL EMISSIONS SUMMARY
GAS PRODUCTION UNIT (GPU-3)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Pollutant ¹	Emission Factors ² (lb/MMSCF)	Potential Emission Rates ³	
		(lb/hr)	(T/yr)
NO _x	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

TABLE 9

**POTENTIAL EMISSIONS SUMMARY
LINE HEATER (HTR-1)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Pollutant ¹	Emission Factors ² (lb/MMSCF)	Potential Emission Rates ³	
		(lb/hr)	(T/yr)
NO _x	100.0	0.15	0.64
VOC	5.5	0.01	0.04
CO	84.0	0.12	0.54
PM	7.6	0.01	0.05
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0005
n-Hexane	1.8	0.003	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.50 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

TABLE 10

**POTENTIAL EMISSIONS SUMMARY
FLASH SEPARATOR HEATER (SEP-1)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Pollutant ¹	Emission Factors ² (lb/MMSCF)	Potential Emission Rates ³	
		(lb/hr)	(T/yr)
NO _x	100.0	0.10	0.43
VOC	5.5	0.01	0.02
CO	84.0	0.08	0.36
PM	7.6	0.01	0.03
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0003
n-Hexane	1.8	0.002	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 1.00 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

TABLE 11

**POTENTIAL EMISSIONS SUMMARY
CONDENSATE STABILIZER HEATER (CS-1)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Pollutant ¹	Emission Factors ² (lb/MMSCF)	Potential Emission Rates ³	
		(lb/hr)	(T/yr)
NO _x	100.0	0.07	0.32
VOC	5.5	0.004	0.02
CO	84.0	0.06	0.27
PM	7.6	0.01	0.02
Benzene	0.0021	<0.0001	<0.0001
Formaldehyde	0.075	<0.0001	0.0002
n-Hexane	1.8	0.001	0.01
Toluene	0.0034	<0.0001	<0.0001

Notes:

1. HAP emissions include Benzene, Formaldehyde, n-Hexane, and Toluene.
2. Emission factors obtained from AP-42 Section 1.4 (7/98), Table 1.4-1 through 1.4-3 for commercial boilers.
3. Potential emissions based on AP-42 emission factors, maximum firing rate of 0.75 MMBtu/hr, 1,020 Btu/scf fuel heating value, and 8,760 hours of operation per year.

TABLE 12

**POTENTIAL EMISSIONS SUMMARY
CONDENSATE AND PRODUCED WATER STORAGE TANKS
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Source	Source ID	Annual Throughput (gallons/year)	Tank Capacity (gallons)	Potential VOC Emissions ¹					Potential HAP Emissions				
				Annual Breathing Losses ² (lbs)	Annual Working Losses ² (lbs)	Annual Flash Losses ³ (T/yr)	Flare Capture Efficiency ⁴ (%)	Total Annual Emissions ⁵ (T/yr)	Benzene Emissions ⁶ (T/yr)	Toluene Emissions ⁶ (T/yr)	Ethylbenzene Emissions ⁶ (T/yr)	Xylenes Emissions ⁶ (T/yr)	n-Hexane Emissions ⁶ (T/yr)
Condensate Storage Tank (400-bbl)	CTK-1	255,500	16,800	1,619.94	2,798.68	88.82	98%	1.82	0.0001	<0.0001	<0.0001	<0.0001	0.0004
Condensate Storage Tank (400-bbl)	CTK-2	255,500	16,800	1,619.94	2,798.68	88.82	98%	1.82	0.0001	<0.0001	<0.0001	<0.0001	0.0004
Condensate Storage Tank (400-bbl)	CTK-3	255,500	16,800	1,619.94	2,798.68	88.82	98%	1.82	0.0001	<0.0001	<0.0001	<0.0001	0.0004
Produced Water Storage Tank (400-bbl)	PTK-1	1,277,500	16,800	1,619.94	7,614.51	0.15	98%	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Produced Water Storage Tank (400-bbl)	PTK-2	1,277,500	16,800	1,619.94	7,614.51	0.15	98%	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Produced Water Storage Tank (400-bbl)	PTK-3	1,277,500	16,800	1,619.94	7,614.51	0.15	98%	0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Notes:

- Based on the following maximum annual throughput values:
 Condensate = 18,250-bbls/yr
 Produced Water = 91,250-bbls/yr
- Annual breathing and working losses were determined using AP-42 Section 7 (11/06).
- Annual flash losses were based on Promax simulation method. A copy of the Promax output has been provided.
- Breathing, working and flash emissions from the storage tank(s) are routed to an enclosed combustor, which has a capture efficiency of 98%.
 Refer to Table 14 for flare(s) emissions calculations.
- To be conservative, breathing and working losses for produced water were calculated using condensate, assuming 1% is emitted. Flash losses for produced water were calculated using ProMax.
- Estimated HAP Composition (% by Weight), Promax output reports of a site specific sample.
 Total Annual Emissions (T/yr) = (((Breathing Losses (lbs) + Working Losses (lbs)) / 2000) + Flash Losses (T/yr)) x [1 - Enclosed Combustor Capture Efficiency (%)]
 Total Annual Emissions (T/yr) = (((Breathing Losses (lbs) + Working Losses (lbs)) / 2000) x 1%) + Flash Losses (T/yr) x [1 - Enclosed Combustor Capture Efficiency (%)]

Benzene = 0.004%
 Toluene = 0.001%
 Ethylbenzene = 0.000038%
 Xylenes = 0.000095%
 n-Hexane = 0.021%

TABLE 13

POTENTIAL EMISSIONS SUMMARY
AP-42 SECTION 7 (EPA TANKS 4.0.9d) FIXED-ROOF TANK EMISSIONS
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Tank Identification	WJ Criswell 405, CTK-1-3	WJ Criswell 405, PTK-1-6
Location for Calculation Purposes	Charleston, West Virginia	Charleston, West Virginia
Contents of Tank	Gasoline (RVP 15.0)	Gasoline (RVP 15.0)
Tank/Roof Type	Dome	Dome
Underground?	Aboveground	Aboveground
Diameter, ft	12.0	12.0
Shell Height or Length, ft	20.0	20.0
Nominal Capacity, gal	16,800	16,800
Throughput, gallons/yr	255,500	1,277,500
Tank Paint Color	White	White
Tank Paint Condition	Good	Good
Effective Diameter, ft	12.0	12.0
Geometric Capacity, gal	16,074	16,074
Maximum Liquid Height, ft	19.0	19.0
Average Liquid Height, ft	14	14
Cone Tank Roof Slope, ft/ft	0.0625	0.0625
Dome Tank Roof Radius, ft	12.00	12.00
Dome Tank Roof Height, ft	1.608	1.608
Roof Outage, ft	0.823	0.823
Vapor Space Outage, ft	6.57	6.57
Vapor Space Volume, ft ³	743	743
Average Daily Minimum Ambient Temperature, F	44.22	44.22
Average Daily Maximum Ambient Temperature, F	65.75	65.75
Daily Total Solar Insolation Factor, Btu/ft ² /day	1251	1251
Daily Average Ambient Temperature, F	55.0	55.0
Tank Paint Solar Absorbance, dimensionless	0.170	0.170
Daily Vapor Temperature Range, R	21.5	21.5
Daily Average Liquid Surf. Temperature, F	56.7	56.7
Daily Minimum Liquid Surf. Temperature, F	51.3	51.3
Daily Maximum Liquid Surf. Temperature, F	62.0	62.0
Liquid Bulk Temperature	55.00	55.00
Vapor Molecular Weight, lb/lbmol	60.0	60.0
Antoine's Coefficient A	N/A	N/A
Antoine's Coefficient B	N/A	N/A
Antoine's Coefficient C	N/A	N/A
Type of Substance (for use in calculations)	Gas	Gas
Vapor Pressure at Daily Av. Liquid Surf. Temp., psia	7.668	7.668
Vapor Pressure at Daily Min. Liquid Surf. Temp., psia	6.935	6.935
Vapor Pressure at Daily Max. Liquid Surf. Temp., psia	8.460	8.460
Vapor Pressure Calculation Method	AP-42 Figure 7.1-14b: RVP=15 ASTM Slope=3	AP-42 Figure 7.1-14b: RVP=15 ASTM Slope=3
Vapor Density, lb/ft ³	0.083030	0.083030
Daily Vapor Pressure range, psi	1.525	1.525
Breather Vent Pressure Setting, psig	0.0300	0.0300
Breather Vent Vacuum Setting, psig	-0.0300	-0.0300
Breather Vent Pressure Setting Range, psi	0.0600	0.0600
Ambient Pressure, psia	14.3	14.3
Vapor Space Expansion Factor	0.2640	0.2640
Vented Vapor Saturation Factor	0.272	0.272
Annual Turnovers	15.89	79.47
Turnover Factor	1.00	0.54
Working Loss Product Factor	1.00	1.00
Standing Storage Loss, lb/yr	1,619.94	1,619.94
Working Loss, lb/yr	2,798.68	7,614.51
Total Losses, lb/yr	4,418.62	9,234.44
Standing Storage Loss, TPY	0.81	0.81
Working Loss, TPY	1.40	3.81
Total Losses, TPY	2.21	4.62

Based on AP-42, February 1996, Section 7.1.3.1.

TABLE 14

**POTENTIAL EMISSIONS SUMMARY
ENCLOSED COMBUSTOR (CTRL-1)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Pollutant	Emission Factors ¹ (lb/MMBtu)	Potential Tank Losses ²		Flare Destruction Efficiency (%)	Total Potential Emission Rates ³	
		(lb/hr)	(T/yr)		(lb/hr)	(T/yr)
NO _x	0.068	---	---	---	1.25	5.49
CO	0.370	---	---	---	6.82	29.85
VOC	---	61.23	268.20	98%	1.22	5.36

Notes:

1. Emission factors for NO_x and CO obtained from AP-42 Table 13.5-1 (9/91) for industrial flares.
2. Potential tank emissions are estimated based on the breathing, working, and flash losses from the storage tank(s) and a 98% capture efficiency at the combustor (refer to Table 12).
3. Potential emissions for NO_x and CO are based on AP-42 emission factors, an estimated heat value of 18.42 MMBtu/hr, and 8,760 hours of operation per year.
Potential emissions for VOC are based on a 98% capture efficiency from the storage tank(s), a 98% destruction efficiency from the enclosed combustor, and 8,760 hours of operation per year.

TABLE 15

**POTENTIAL EMISSIONS SUMMARY
CONDENSATE TRUCK LOADING (TRL-1)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Material Name	Constituent	Saturation Factor ¹ (S)	True Vapor Pressure (P)	MW of Vapors (M) (lb/lb-mole)	Temp of Loaded Liquid (°F)	Emission Factor ¹ (lb VOC/10 ³ gal)	Maximum		Uncontrolled VOC Emissions	
							Hourly Throughput ² (gals)	Annual Throughput ³ (gals)	Hourly Emissions ⁴ (lb/hr)	Annual Emissions ⁵ (T/yr)
Condensate	VOC	0.6	8.46	60	55	7.369	8,000	766,500	58.95	2.82

Notes:

1. Per AP-42, 5th Edition (6/08), Section 5.2, Equation 1

$$Emission\ Factor\ \left(\frac{lb\ VOC}{10^3\ gal}\right) = \left(\frac{S \times P \times M}{P_F + 460}\right) \times 12.46$$

2. Maximum hourly throughput is the amount of condensate loaded out from the storage tank(s).
3. Annual Throughput is the amount of condensate loaded out from the storage tank(s).
4. Uncontrolled Hourly Emissions = Hourly Throughput / 1000 x Emission Factor
5. Uncontrolled Annual Emissions = Annual Throughput / 1000 x Emission Factor / 2000 lb/T

Estimated HAP Composition (% by Weight)**

		Uncontrolled Emissions	
Pollutant	Wt%	(lb/hr)	(tpy)
Benzene	0.004%	0.002	0.0001
Toluene	0.001%	0.001	0.00003
Ethylbenzene	0.00004%	0.00002	0.000001
Xylenes	0.0001%	0.00006	0.000003
n-Hexane	0.02%	0.01	0.001
Total HAPs	0.03%	0.02	0.001

Estimated HAP Composition (% by Weight), Promax output reports of a site specific sample.

TABLE 16

**POTENTIAL EMISSIONS SUMMARY
PRODUCED WATER TRUCK LOADING (TRL-2)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Material Name	Constituent	Saturation Factor ¹ (S)	True Vapor Pressure (P)	MW of Vapors (M) (lb/lb-mole)	Temp of Liquid (°F)	Emission Factor ¹ (lb VOC/10 ³ gal)	Maximum		Uncontrolled VOC Emissions	
							Hourly Throughput ² (gals)	Annual Throughput ³ (gals)	Hourly Emissions ⁴ (lb/hr)	Annual Emissions ⁵ (T/yr)
Condensate ⁶	VOC	0.6	8.46	60	55	7.369	8,000	3,832,500	0.59	0.14

Notes:

1. Per AP-42, 5th Edition (6/08), Section 5.2, Equation 1

$$Emission\ Factor\left(\frac{lb\ VOC}{10^3\ gal}\right) = \left(\frac{S \times P \times M}{^\circ F + 460}\right) \times 12.46$$

2. Maximum hourly throughput is the amount of produced water loaded out from the storage tank(s).
3. Annual Throughput is the amount of produced water loaded out from the storage tank(s).
4. Uncontrolled Hourly Emissions = Hourly Throughput / 1000 x Emission Factor
5. Uncontrolled Annual Emissions = Annual Throughput / 1000 x Emission Factor / 2000 lb/T
6. Loading emissions for produced water were calculated using condensate, assuming 1% is emitted.

Estimated HAP Composition (% by Weight)**

Uncontrolled Emissions	
Pollutant	Wt%
Benzene	0.003%
Toluene	0.001%
Ethylbenzene	0.00003%
Xylenes	0.0001%
n-Hexane	0.002%
Total HAPs	0.01%

Estimated HAP Composition (% by Weight), Promax output reports of a site specific sample.

TABLE 17

**POTENTIAL EMISSIONS SUMMARY
PROCESS PIPING FUGITIVES (FUG-1)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC**

Component Type	Type of Service ¹	Number of Components ¹	Emission Factors (lb/hr-component) ²	Percent VOC ³	Potential VOC Emission Rates ⁴	
					(lb/hr)	(T/yr)
Valves	Gas/Vapor	200	0.00992	16.02%	0.32	1.39
Flanges	Gas/Vapor	700	0.00086	16.02%	0.10	0.42
Relief Valves	Gas/Vapor	20	0.0194	16.02%	0.06	0.27
Connectors	Gas/Vapor	800	0.00044	16.02%	0.06	0.25
Valves	Light Liquid	200	0.0055	100.00%	1.10	4.82
Flanges	Light Liquid	25	0.000243	100.00%	0.01	0.03
Relief Valves	Light Liquid	15	0.0165	100.00%	0.25	1.08
Connectors	Light Liquid	500	0.000463	100.00%	0.23	1.01
Totals:	---	2,460	---	---	2.13	9.27

Notes:

1. Number of each component and type of service estimated based on a similar station.
2. Emission factors based on EPA's natural gas processing factors for process piping fugitive emissions.
3. Percent VOC for Gas/Vapor service based on a gas analysis from the Facility (refer to Attachment 18).
4. Emission rates based on 8,760 hours of operation per year.

Estimated HAP Composition (% by Weight)**

Pollutant	Wt% ¹	Total Fugitive HAP Uncontrolled Emissions	
		(lb/hr)	(T/yr)
Benzene	0.028%	0.001	0.003
Toluene	0.118%	0.003	0.01
Ethylbenzene	0.0049%	0.0001	0.0005
Xylenes	0.025%	0.001	0.002
n-Hexane	0.136%	0.003	0.01
Total HAPs	0.312%	0.01	0.03
Total VOCs	16.021%	2.13	9.27

Based on Gas Analyses. An extended analysis was unavailable, therefore, GRI GlyCalc factors for production were used to estimate C6+ breakout

TABLE 18

GAS ANALYSIS
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Component ¹	Molecular Weight	Mol % ²	Molar Weight ³	Average Mass % ⁴
Carbon Monoxide	28.01	0.000%	0.000	0.000%
Hydrogen Sulfide	34.08	0.000%	0.000	0.000%
Oxygen	16.04	0.000%	0.000	0.000%
Helium	4	0.000%	0.000	0.000%
Nitrogen	28.02	0.241%	0.068	0.333%
Carbon Dioxide	44.01	0.165%	0.073	0.358%
Methane	16.04	79.701%	12.784	62.970%
Ethane	30.07	13.718%	4.125	20.319%
Propane	44.09	3.893%	1.716	8.455%
i-Butane	58.12	0.561%	0.326	1.606%
n-Butane	58.12	0.882%	0.513	2.525%
i-Pentane	72.15	0.271%	0.196	0.963%
n-Pentane	72.15	0.194%	0.140	0.689%
Other Hexanes	86.17	0.138%	0.119	0.585%
n-Hexane	86.17	0.032%	0.028	0.136%
Heptanes	100.2	0.063%	0.063	0.310%
2,2,4-Trimethylpentane	114.23	0.018%	0.021	0.101%
Benzene	78.11	0.007%	0.006	0.028%
Toluene	92.14	0.026%	0.024	0.118%
Octanes+	114.23	0.084%	0.096	0.474%
e-Benzene	106.17	0.001%	0.001	0.005%
Xylenes	106.17	0.005%	0.005	0.025%
Totals:		100.00%	20.30	100.00%
⁵ VOC Totals:		6.18%	3.25	16.02%

Notes:

1. Typical components listed in gas analysis for field gas.
2. Mol % values obtained from the gas analysis from the Facility.
3. Molar weight = Molecular weight x Mol % /100.
4. Average mass % = Molar weight / Total molar weight.
5. VOC Totals include the following components (C3+):

Propane	n-Hexane
i-Butane	Heptanes
n-Butane	Benzene
i-Pentane	Toluene
n-Pentane	Octanes
Hexanes	e-Benzene
	Xylenes

TABLE 19

POTENTIAL EMISSIONS SUMMARY
UNPAVED ROADS (ROADS)
WJ CRISWELL 405 FACILITY
ASCENT RESOURCES – MARCELLUS, LLC

Name	Vehicle Miles Traveled ¹		Emission Factor ²			PM Emissions ⁴			
			PM _{2.5}	PM ₁₀	PM _{tot}	PM _{2.5}		PM ₁₀	
	(VMT/hr)	(VMT/yr)	(lb/VMT)	(lb/VMT)	(lb/VMT)	(lb/hr)	(T/yr)	(lb/hr)	(T/yr)
Unpaved Roads	0.33	2,920.0	0.15	1.46	4.93	0.02	0.10	0.22	0.96
Total						0.02	0.10	0.22	0.96

Notes:

1. Facility vehicle data based on estimates, GP5.1 and AP-42 Section 13.2.2 (11/06) defaults for industrial unpaved roads.

Light Vehicles (Pick-up Trucks and Cars)	Heavy Trucks (Trailer Trucks)
Average vehicle weight (tons): 2.5	23.7
Number of wheels per vehicle type: 4	18
Average number of round trips/day: 2.0	2.0
Distance per round trip (miles/trip): 2	2
Number of days operational (days/yr): 365	365
Vehicle miles travelled VMT (miles/yr): 1460.0	1460.0

Vehicle miles traveled was calculated with the following equation:

$$VMT = \sum_{Vehicle\ Types} \left(\frac{avg.\ number\ of\ round\ trips}{day} \times \frac{vehicle\ miles\ traveled}{round\ trip} \times \frac{days\ of\ operation}{year} \right)$$

2. Emission factor obtained from AP-42 Section 13.2.2 Table 13.2.2-1 (11/06), formula (1a) and formula (2).

$$E_{ext} = E \left[\frac{(365 - P)}{365} \right]$$

$$E = k \left(\frac{s}{12} \right)^a \left(\frac{W}{3} \right)^b \left(\frac{lb/VMT}{1} \right)$$

where:

E_{ext} = annual size-specific emission factor extrapolated for natural mitigation (lb/VMT)
E = emission factor (lb/VMT)
P = number of days in a year with at least 0.01 in of precipitation
s = surface material silt content (%)
W = mean vehicle weight (tons)
k, a, b = empirical constants

$$W_{avg} = \left(\frac{W_{empty} + W_{loaded}}{2} \right)$$

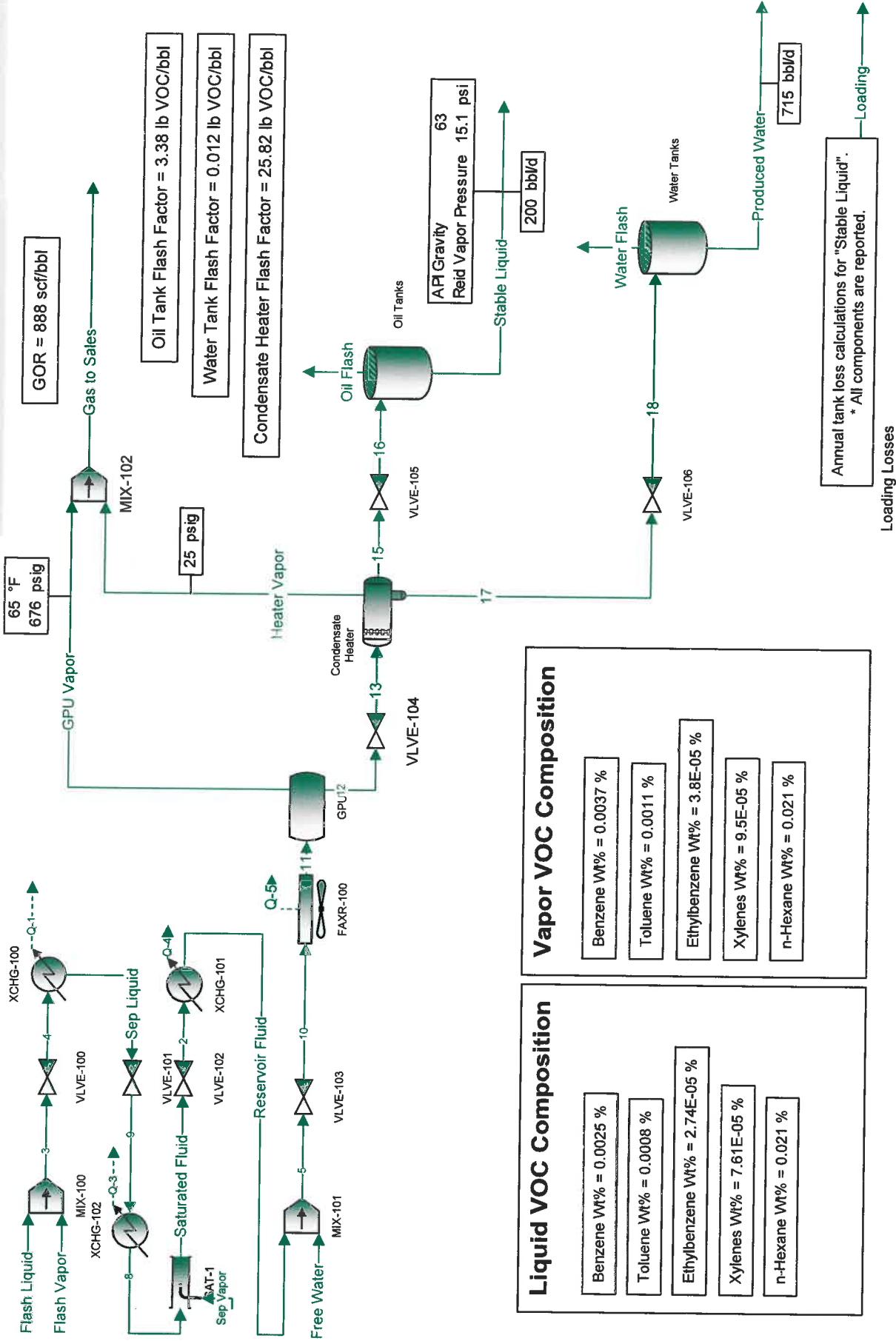
Constants		
PM-2.5	PM-10	PM-30 (TSP)
k: 0.15	1.5	4.9
a: 0.9	0.9	0.7
b: 0.45	0.45	0.45

3. Natural control efficiency based on moisture ratio and AP-42 Section 13.2.2 Figure 13.2.2-2 (11/06). Controlled emissions are based on the natural rainfall cycles and no plant control.

Natural Control Efficiency (%) = $\frac{2}{55}$ Estimated based on 0.4% controlled and 0.2% uncontrolled surface water content

4. Potential emissions based on AP-42 Section 13.2.2 Table 13.2.2-1 (11/06) emission factors and the listed control efficiency.

$$Total\ Annual\ Emissions\ (T/yr) = \left(\frac{VMT}{yr} \times Emission\ Factor \right) \times (1 - Control\ Efficiency)$$



Compositional Analysis of Separator Gas

RFS ID No. 42552-02

Sample date and time: March 25, 2015 at 1625 hours

Sampling Conditions: 676 psia at 80 °F

Opening Conditions: 721 psia at 120 °F

	Component	Mole %	GPM at 14.85 psia	Weight %	Molecular Weight
N ₂	Nitrogen	0.241	0.000	0.332	28.013
CO ₂	Carbon Dioxide	0.165	0.000	0.357	44.010
H ₂ S	Hydrogen Sulfide *	0.000	0.000	0.000	34.082
C1	Methane	79.701	0.000	62.995	16.043
C2	Ethane	13.718	3.692	20.322	30.070
C3	Propane	3.893	1.081	8.457	44.097
iC4	Iso-Butane	0.561	0.185	1.608	58.123
nC4	N-Butane	0.882	0.280	2.524	58.123
iC5	Iso-Pentane	0.271	0.100	0.964	72.150
nC5	N-Pentane	0.194	0.071	0.689	72.150
C6	Hexanes	0.177	0.074	0.752	86.177
C7	Heptanes	0.089	0.040	0.427	97.327
C8	Octanes	0.056	0.026	0.299	107.827
C9	Nonanes	0.052	0.020	0.274	106.167
C10+	Decanes Plus	0.000	0.000	0.000	134.000
	Total	100.000	5.569	100.000	

* Please note that 0 ppm H₂S was detected in the field by stain tube

Calculated Properties of Gas

Data at 14.85 psia

Gas Specific Gravity (Air = 1.00)	=	0.7029	
Net Heat of Combustion (Btu/Cu.Ft. at 60 °F)	Dry =	1,130.8	Real
Gross Heat of Combustion (Btu/Cu.Ft. at 60 °F)	Dry =	1,247.5	Real
Gross Heat of Combustion (Btu/Cu.Ft. at 60 °F)	Wet =	1,225.7	Water Sat.
Gas Compressibility (1 Atm. at 60 °F)	Z =	0.9967	

- ☐ Heat of combustion is the quantity of heat produced when gas is burned completely to carbon dioxide and water.
- ☐ Wet and dry refer to the condition of the gas prior to combustion.
- ☐ Wet refers to a gas that is saturated with water vapor, and dry refers to a gas that contains no water vapor prior to combustion.
- ☐ Net and gross refer to the condition of the water resulting from combustion.
- ☐ Gross heat is the heat produced in complete combustion under constant pressure with the combustion products cooled to standard conditions and the water of the combustion products condensed to the liquid state.
- ☐ Net heat is the heat produced in complete combustion under constant pressure with the combustion products cooled to standard conditions and the water of combustion products remains in the vapor phase.

Separator Liquid Composition

RFS ID No. 42552-04

Flash Summary (1,800 psia and 80 °F to atmospheric pressure and 60 °F)

Gas-Oil Ratio	873	Scf/Stb	Color	Dark Amber
Vapor Gravity	1.250	(Air = 1.00)	API Gravity (water free)	62.0 °API at 60 °F
Shrinkage	0.643	Vstd / Vsat	Water content by Karl Fisher	0.30 Weight %
Separator Liquid Density	0.624	g/cc at 676 psia and 80 °F		

Component (Symbol / Name)	Flash Vapor (mole %)	Flash Liquid (mole %)	Flash Liquid (weight %)	Molecular Weight	Specific Gravity (water = 1.0)	Separator Liquid (mole %)	Separator Liquid (weight %)
N ₂ Nitrogen	0.000	0.000	0.000	28.01	0.809	0.000	0.000
CO ₂ Carbon Dioxide	0.091	0.000	0.000	44.01	0.818	0.046	0.027
H ₂ S Hydrogen Sulfide	0.000	0.000	0.000	34.08	0.801	0.000	0.000
C1 Methane	33.495	0.118	0.016	16.04	0.300	17.150	3.675
C2 Ethane	26.600	0.091	0.024	30.07	0.356	13.618	5.470
C3 Propane	19.211	1.024	0.391	44.10	0.507	10.305	6.070
iC4 i-Butane	4.369	1.080	0.543	58.12	0.563	2.758	2.142
nC4 n-Butane	7.933	3.511	1.767	58.12	0.584	5.767	4.478
iC5 i-Pentane	3.005	4.399	2.747	72.15	0.624	3.688	3.554
nC5 n-Pentane	2.141	5.764	3.600	72.15	0.631	3.915	3.773
C6 Hexanes	1.843	13.368	9.974	86.18	0.664	7.487	8.619
C7 Heptanes	0.724	15.345	12.931	97.35	0.700	7.884	10.252
C8 Octanes	0.309	16.603	15.799	109.89	0.724	8.288	12.167
C9 Nonanes	0.063	10.208	10.764	121.79	0.756	5.031	8.185
C10 Decanes	0.216	6.584	7.638	135.68	0.779	3.335	6.043
C11 Undecanes		4.523	5.756	147.00	0.790	2.215	4.349
C12 Dodecanes		4.408	6.143	161.00	0.801	2.159	4.642
C13 Tridecanes		4.922	7.457	175.00	0.812	2.410	5.635
C14 Tetradecanes		3.702	6.090	190.00	0.823	1.813	4.601
C15 Pentadecanes		2.184	3.895	206.00	0.833	1.070	2.943
C16 Hexadecanes		1.166	2.242	222.00	0.840	0.571	1.693
C17 Heptadecanes		0.509	1.044	237.00	0.848	0.249	0.789
C18 Octadecanes		0.255	0.554	251.00	0.853	0.125	0.419
C19 Nonadecanes		0.065	0.147	263.00	0.858	0.032	0.112
C20 Eicosanes		0.046	0.110	275.00	0.863	0.023	0.083
C21 Heneicosanes		0.017	0.042	291.00	0.868	0.008	0.032
C22 Docosanes		0.017	0.044	305.00	0.873	0.008	0.034
C23 Tricosanes		0.017	0.047	318.00	0.878	0.008	0.035
C24 Tetracosanes		0.015	0.043	331.00	0.882	0.007	0.032
C25 Pentacosanes		0.016	0.049	345.00	0.886	0.008	0.036
C26 Hexacosanes		0.015	0.045	359.00	0.890	0.007	0.035
C27 Heptacosanes		0.010	0.034	374.00	0.894	0.005	0.024
C28 Octacosanes		0.006	0.021	388.00	0.897	0.003	0.015
C29 Nonacosanes		0.006	0.019	402.00	0.900	0.003	0.016
C30+ Triacosanes Plus		0.006	0.024	426.00	0.906	0.003	0.017
Total	100.000	100.000	100.000			100.000	100.000
Calculated Mole Weight	35.85	115.51				74.86	
Measured Mole Weight		123.54					

- ☐ Compositional groupings based on normal to normal carbon distribution.
☐ Pristane is included as C₁₇ and Phytane is included as C₁₈.

Compositional Groupings of Separator Liquid

Group	Mole %	Weight %	MW	SG
Total Fluid	100.000	100.000	74.86	
C7+	35.266	62.192	132.02	0.764
C10+	14.062	31.587	168.17	0.808
C20+	0.084	0.360	322.19	0.879
C30+	0.003	0.017	426.00	0.906

Compositional Analysis of Separator Gas

RFS ID No. 42552-02

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iC5	Iso-Pentane	0.271	0.100	0.964	72.150
nC5	N-Pentane	0.194	0.071	0.689	72.150
C6	Hexanes	0.177	0.074	0.752	86.177
C7	Heptanes	0.089	0.040	0.427	97.327
C8	Octanes	0.056	0.026	0.299	107.827
C9	Nonanes	0.052	0.020	0.274	106.167
C10+	Decanes Plus	0.000	0.000	0.000	134.000
	Total	100.000	5.569	100.000	

* Please note that 0 ppm H₂S was detected in the field by stain tube

Calculated Properties of Gas

Data at 14.85 psia

Gas Specific Gravity (Air = 1.00)	=	0.7029	
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Gross Heat of Combustion (Btu/Cu.Ft. at 60 °F)	Dry =	1,247.5	Real
Gross Heat of Combustion (Btu/Cu.Ft. at 60 °F)	Wet =	1,225.7	Water Sat.
Gas Compressibility (1 Atm. at 60 °F)	Z =	0.9967	

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- ☐ Net and gross refer to the condition of the water resulting from combustion.
- ☐ Gross heat is the heat produced in complete combustion under constant pressure with the combustion products cooled to standard conditions and the water of the combustion products condensed to the liquid state.
- ☐ Net heat is the heat produced in complete combustion under constant pressure with the combustion products cooled to standard conditions and the water of combustion products remains in the vapor phase.

Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans

Monitoring/Recordkeeping/Reporting/Testing Plans

Ascent will monitor, record, report, and test as required by 45CSR6 and 45CSR13.

Ascent will maintain a Certificate of Conformity for the generator (ENG-2), as required by 40 CFR Part 60 NSPS Subpart JJJJ.

Attachment P: Public Notice

AIR QUALITY PERMIT NOTICE

Notice of Application

Notice is given that Ascent Resources – Marcellus, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit for the WJ Criswell 405 facility located near Wileyville, in Wetzel County, West Virginia. The latitude and longitude coordinates are: 39.60737°N, -80.61828°W

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

NO_x = 10.07 TPY
CO = 34.82 TPY
VOC = 23.33 TPY
PM₁₀ = 0.28 TPY
SO₂ = <0.01 TPY
HAPs = 0.17 TPY

Startup of operation is planned to begin on or about the 16th day of November, 2016. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the 16th day of November, 2016.

By: Ascent Resources – Marcellus, LLC
Tim Cummings
VP - Operations
PO Box 13678
Oklahoma City, OK 73113

Attachment Q: Business Confidential Claims (Not Applicable)

Attachment R: Authority Forms (Not Applicable)

Attachment S: Title V Permit Revision Information (Not Applicable)

Application Fee